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A MAJOR OPERATION

THE seven months that have passed since the birth of the nationalised gas industry represent much too short a time in its family history in which to be quite sure what the infant is going to be when it grows up. Those to whom its nurture has been entrusted are, however, beginning to get some idea as to how the organisation is going to work. The actual change on May 1 was accomplished smoothly and unobtrusively but the industry has still to reap the benefit of integration and the public to enjoy a really efficient, adequate, and economical gas service. At the Eastern Association of Gas Engineers and Managers' luncheon last Friday Colonel H. C. Smith spoke of the change as a major operation which the industry resisted as long as it could. We would go a little further and regard Colonel Smith as the senior surgeon who, regardless of his personal feelings, not only helped in the success of the operation but continues in constant attendance on the patient to see that the results are complete and enduring. With Sir Edgar Sylvester he has paid a round of visits since vesting day and has found much enthusiasm and high efficiency. But he has been shocked with what he has seen, not only in small undertakings.

Gas engineers do not, as a rule, pay organised visits to other than the best works and are thus liable to see the industry through rose-coloured spectacles, but Colonel Smith's probe has revealed much leeway to be made up. He has met with instances of political anti-nationalisation bias and sheer laziness, but in the main there has been earnest endeavour to maintain high efficiency, sometimes against heavy odds. Most large-scale integration schemes must, because of financial stringencies, remain in abeyance for some indefinite time, but there is much that can be done on a small scale to improve the position, and Colonel Smith appealed, through the Eastern Association. to gas engineers in general to co-operate with their area boards in making the best of prevailing circumstances. He emphasised that the gas industry, the third of the fuel industries to be nationalised, was fortunate in the much larger measure of decentralisation which the Gas Act allowed. Coal is under a national board; electricity is run, on the generating side, by a central authority and, on the distribution side, by regional or area boards, but the gas industry is owned and managed autonomously by the 12 area boards whose chairmen constitute six-sevenths of the Gas Council, which deals only with matters at national level and leaves the boards free to deal with their own problems. Colonel Smith's speech was one of the most candid we have heard since vesting day; it should prove a spur to all who heard it.

RURAL GAS SUPPLY

WHENEVER and wherever an adequate supply of gas has been forthcoming in rural districts so has the demand, and the demand has been such as to render the supply economic. Supply of gas to isolated villages is a problem which calls for long term planning and bold policy. There are, of course, prominent examples of efficient rural gas supply, where the services of gas can be enjoyed in the cowsheds, in the cottages of the agricultural labourers, in the manor houses in the wilds of the country, where there is gas for bread baking and fish frying and even 'industrial' purposes. The examples are too few, but it is to be hoped that area board organisation will quicken the practical possibilities of country gas supply, and it is also to be hoped that too much faith is not placed in the questionnaire or the canvass. In this regard we were interested in a comment made by Mr. C. E. Grimwood last Friday in his address as President of the Eastern Association of Gas Engineers and Managers. The East Anglian, he said, is a cautious individual and will not readily commit himself. He is, however, quite ready to adopt a new idea when it has been tried out by someone else and found to be satisfactory. The comment is applicable to areas other than East Anglia and adds point to our contention that the demand for gas at a reasonable price in rural districts exists and that the first step is to make a supply of gas available.

Mr. Grimwood mentioned that several of the villages surrounding Sudbury, in Suffolk, at one time had their own gasworks, but that after the first world war difficulties resulted in quite a number of them being shut down. For many years most of these villages have been supplied with electricity, but there is ample evidence that the demand for gas is there—a demand which in part is being met by bottled gas, the economics of which system could to advantage be brought into the open. We suppose that with new town gas supplies of any type we should be well advised to discard pre-1939 cost values. Coal costs, for instance, are up by 140%, wages by nearly 100%,

plant by anything between 150 and 200%. Figures were recently given by the Deputy Chairman of the Eastern Gas Board, Mr. J. H. Dyde, for gas supply, not to a remote village, but to large scale development for satellite towns. The figures are estimates, but they are significant. Capital costs for supply worked out to 5.32d. a therm—that only as a start. The cost of gas to the small consumer, even in a town of the type, cannot well prove less than 18d. a therm; and costs are rising. *A fortiori* gas cannot be cheap, compared with 1939, in rural parts, in isolated villages. Comparisons must be made, therefore, with other fuels at today's prices. The while the element of competition does not diminish. The Eastern Gas Board has about 603,800 consumers. The Eastern Electricity Board has over 1,250,000 consumers, and in September last the latter board connected 4,415 new consumers, 99 farms, and 31 new housing estates. Obviously, gas leeway can be made good only by integration and other schemes through area working. In this regard nationalisation affords an opportunity, but we cannot think that it will afford for some time to come what can be considered, in the light of pre-war days, a cheap fuel supply.

WORLD FUEL

THE blunt fact facing the human race at this point in its history is that it threatens to outgrow its resources in food and fuel. Its numbers are increasing at the astounding annual rate of 20 mill. or nearly 1%. There must be a limit to the size of the world's population which its resources will support; and though this is estimated or guessed at figures as far apart as 4,000 and 9,000 mill., the figure of 3,500 mill. will be reached in another 50 years. In the meantime it is to be noted that half of the total coal used from the beginning of history has been consumed in the last 30 years—half the petroleum in the last 10 years—and broadly speaking these are the only basic fuels now available in significant quantities to meet human needs of heat and power. Dr. A. Parker's masterly survey in this year's Thomas Hawksley Lecture to the Institution of Mechanical Engineers of world energy resources and their utilisation is therefore a document of first importance. All will agree with his insistence on the paramount and urgent necessity for wise planning to secure the use of these basic fuels with maximum efficiency, planning informed with a thorough knowledge of their properties, and with scientific method of the highest order, opening up an enormous field for research and development work which the world cannot afford to neglect.

The Statistical Year Books of the World Power Conference give, said Dr. Parker, the best available information on world resources of coals of all kinds. This information is still incomplete. Geological surveys in Asia and some other continental areas are not nearly so advanced as those in North America and Europe. The magnificent work put in by the Fuel Research Board during the last 25 years has resulted in the accumulation of data relating to the quantity of coal reserves in Great Britain which is far in advance of similar data relating to any other part of the world. But such information as is available indicates that about one-half of the world reserves of all classes of coal and lignites lies in the United States of America, with the U.S.S.R. next in order and China (about which the data must be very incomplete) a close third, Great Britain coming sixth in the list. Another important deduction is that the Commonwealth altogether possesses a reserve only one-fifth that of the U.S.A., only one-half of the possible reserves in either the U.S.S.R. or China, and less than one-tenth of the total world reserves.

These are figures which must give us 'furiously to think' especially as we have no significant reserves or resources of an alternative nature. The fact that world transport tends to be powered more and more with liquid fuel is no consolation to us. We cannot turn our coal into oil with a less expenditure of something like four or five tons of coal per ton of liquid fuel produced. And these figures do not include the coal equivalent of the very high capital and maintenance costs of the apparatus itself. From the world point of view estimates of petroleum reserves are much more uncertain than those of coal. Indeed we have the somewhat ridiculous position that whereas the life of petroleum reserves has been repeatedly, over the last 30 years, estimated at 15 years the output today is greater than ever. Reserves are still estimated at the old figure, in terms of life, at the present rate of consumption. The distribution of those reserves and the present rate of output in the main oil producing areas are interesting. The reserves proved or estimated in the Middle East are practically equal to those in North America, but the present rate of production in the former area is only one-eighth of that in the latter. The reserves of shale oil are probably twice those of petroleum, with a large fraction in the U.S.A., but the high cost of winning and distilling the shale has kept production down from this source. The possibilities of methane production by the fermentation of sludge are small but capable of increase. Allied with petroleum are fuel resources in the form of natural gas which forms so large a fraction of the gas supply in North America, particularly the U.S.A. It is a pity that its production is associated with so much waste. Dr. Parker quoted the statement that in some oil wells the total thermal value of the gas is greater than that of the oil but that Dr. M. K. Hubbert has suggested that no more than 40% in terms of thermal value is recovered in the American petroleum industry.

ALTERNATIVES

THE lecture went on to survey alternative forms of energy. The total quantity of energy continually radiated from the sun and penetrating to the earth's surface is estimated by Sir Alfred Egerton to be 8,000 times the calorific value of the coal and petroleum produced annually at the present time. But so far it has not been found practicable to harness more than a minute fraction of this for man's use. Timber, alcohol from vegetation, water, and tidal power may be regarded as forms of solar energy. These are classed as replaceable (one might say, practically inexhaustible) assets. The available fuel value of timber is estimated at nearly one-half that of the present world annual production of coal. The production of ethyl alcohol from vegetation, always comparatively very small, is declining. Non-tidal water power is estimated to be capable of producing as much electricity as would require three times the present annual production of coal.

Only 4.3% of this is developed and it is, of course, severely local in its availability. Tidal power, while large in the aggregate, is capable of development in only a few places. A few schemes have been studied, notably that of the Severn barrage, but all have been deemed too costly.

Among the possible alternative sources of heat available to man, that which strikes the imagination perhaps more than others is the immense reservoir of heat stored up in the interior of the earth. We live on the surface and our direct knowledge of the interior is limited to a few thousand feet, a thickness comparable, say, to the outer yellow layer of the skin of the orange in proportion to its radius. But it is known that the temperature increases very rapidly as we penetrate into the crust of the earth. At the bottom of a boring nearly three miles deep in Texas the recorded temperature was about 120°C. It is calculated that at a depth of 500 miles the temperature is in the region of 1,400°C., but at much less depths it must be at a useful figure. The difficulty, as Dr. Parker pointed out, is to collect any appreciable part of this heat energy, —estimated at the stupendous figure of 80 mill. times the estimated probable reserves of coal, and which is being dissipated at an extremely low rate owing to the high insulating property of the earth's crust—at a cost, for use on the surface, which is not prohibitive. We wonder whether he is not just a little too pessimistic. At any rate it is a problem which has not yet been seriously tackled as far as we know. It would be interesting to know whether it has even been seriously discussed. In the meantime it appears probable that it might be worth while extending the few instances mentioned in the lecture where terrestrial heat is collected and utilised where it reaches the surface as geysers or hot springs, perhaps in the direction of volcanoes. Such sources of energy would not be, after all, more severely local in their availability than some cases of water power.

Coming down to earth, the fact that the position of Great Britain in regard to fuel reserves is less favourable than that of some other countries, particularly the United States of America and the Russian Republics, must be viewed with the greatest concern. We cannot wait for the development of atomic energy—in any case our supply of known materials useful in harnessing nuclear energy is *nil*—before getting down to the perfectly practicable duty of exploring and implementing in every possible direction the increase of the overall efficiency of the utilisation of our indigenous fuel resources. On this subject there is nothing extant better than Mr. Oliver Lyle's classic paper 'Inefficiency.' Dr. Parker remarked that in spite of the (recent) advances (in technique) the average efficiency of utilisation of fuel and power resources (in this country) must be well below 20% as ordinarily measured. Mr. Lyle's figure, 15%, is quite reliable and there should be no hesitation is repeating again and again his striking dictum: **Posterity will never forgive us if we continue to waste 85% of our coal.**

EFFLUENTS DISPOSAL

We are hearing a good deal about the problem of disposing of gasworks effluent—for the obvious reason that the problem is a very important one and has a bearing on gas-making economics. In these columns last week we commented on the question in general terms calling attention specifically to the paper by Mr. J. J. Priestley, publication of which we start in our pages today; yesterday afternoon we were listening to the discussion on the communication by Mr. E. M. H. Badger on the subject at the research meeting of the Institution of Gas Engineers; on a later page will be found an abstract of a paper by Mr. A. J. Clifford to the Midland Branch of the Institute of Sewage Purification on experimental work on the treatment of gas liquor at West Bromwich. Mr. Clifford's paper is particularly welcome in demonstrating that co-operation which we have sought between gas undertakings and sewage authorities. The work arose from a request to the West Bromwich sewage works to treat the effluent from the Swan Village gasworks. The sewage works was operating at capacity and was asked to deal with a further 12,000 gal. of gasworks effluent per day, making a total, with the West Bromwich liquor, of 16,000 gal. per day. Experiments were put in hand to show whether the added capacity could be obtained on the filtration plant by recirculation, and this was proved possible—at a cost. And the costs are set out roughly by the author in his paper. The Birmingham gas undertaking has requested that the charges should be based on oxygen-absorption loading, and it is estimated that 7s. 5d. per 1,000 gal. of gas liquor having an oxygen absorption of 2,000 parts per 100,000 would be chargeable. The experimental work continues.

AGREED CHARGES

The North Thames Gas Board expects to use a total of 4,576,000 tons of coal in its first year under nationalisation, of which just under three-quarters comes to London from the north-east coast by sea and slightly over one-quarter from other coalfields by rail. When Mr. Michael Milne-Watson talked to the North Thames Gas Consultative Council last month he pointed out that sea transport was cheaper than rail; but for the fact that the board avails itself of as large a proportion of sea-borne coal as possible, gas would cost more. Last week the consultative council, with a commendable business instinct even if not based on ripe experience of gas industry administration, resolved to ask the board to explore the possibility of securing from British Railways a system of 'agreed charges' for rail-borne coal. A steady load of nearly 1.2 mill. tons per annum merits favourable terms, but we cannot imagine that the Gas Light and Coke Company can have operated for over a century without thinking of that fact, or that such terms as were obtained under the old régime have not been passed on to the new organisations—both sides now nationalised. The choice of rail or sea-borne coal is no mere whim. Every ton of coal that can possibly be carried by sea is shipped, and even during the war it was only in periods of extreme peril that coastal coal was put on rail. There are limitations at both ends. Some of London's coal must come from coalfields far remote from the sea, and some of its gasworks, notably at Harrow, are not near any waterways. In such cases the railway is the only solution and the board must pay such rates as the nationalised British Railways find it necessary to charge.

FAIR PLAY AT THE FESTIVAL

Some indication of the general outlines of the forthcoming Festival of Britain has already been given in the national Press. We are now able to throw some light upon the exhibition on the South Bank, and the manner in which the gas industry and its ramifications are likely to be represented. The theme of the exhibition is, of course, that British achievements in science, technology, and industrial design have resulted from the initiative of the British people in developing the resources of their land, and that the future of Britain is well founded on the continuing achievements of her scientists, industrialists, technologists, and designers. The exhibition, which will occupy only 27 acres, with a covered area not much greater than Olympia, will not be a trade fair such as the B.I.F., where industries or businesses can buy space, but will be selective both in the topics chosen for the theme and in the choice of exhibits to illustrate the story. In the 'upstream sequence,'

considerable importance will be given to natural resources, a section which will include coal-handling plant of various kinds, while the conversion of potential power into usable power for industry will be typified by steam raising and turbo-generation. Coal gas making is included in this section, but judged upon the information so far available gas will play a distinctly subservient part to electricity. In a report dealing with this aspect it is stated that the centre piece will be a scale model of a power station, which will be supported by models of different components of a power station with a few full-size pieces of equipment. As an afterthought it is added that 'reference to other forms of power will be made in supporting displays.' This is rather depressing. There is to be a section on illumination. This, however, will be a small section consisting of displays, partly historical, portraying artificial illumination. Electric and gas lamps and fittings will be shown. Not very impressive, but perhaps the Homes and Gardens section will compensate for this apparently slight representation. This section will embrace four types of room and it is understood that gas will be represented in the domestic equipment. In answer to a query regarding the selection of exhibits we were told that the pertinent bodies have been contacted to ensure that gas is adequately and accurately dealt with. Surely it is not too late to request that the interests of the gas industry be energetically supported in such a way that the exhibition planners will allow this vital part of our fuel economy to be pictured in correct proportion to the electricity industry. Visitors from overseas who may be familiar with the achievements of the British gas industry will probably be shocked to find it represented as subservient to and perhaps an appendage of electricity.

Letter to the Editor

SULPHUR IN SPENT OXIDE

DEAR SIR,—In the *Gas Journal* of November 23, M. L. Fassina expresses the opinion that explosions have not occurred in his laboratory during the evaporation of ethereal solutions of sulphur, because the vapours passed through a condenser which prevented air from reaching the heated ether + sulphur mixture.

I would point out that sulphur is known to explode when heated with various oxidising agents, with or without the presence of air, and that ethyl peroxide is a powerful oxidising agent described in the literature as of an explosive character and not uncommonly found in samples of ether which have been stored for a time. Hence it would appear advisable to avoid methods of analysis which might involve heating the two together, even if air can be excluded. The experiments described in my letter to the *Gas Journal* of November 9 give support to this view.

If the ether is freshly made or if it is evaporated fairly rapidly and in the absence of moisture it is unlikely that there will be any peroxide left in the flask with the sulphur, for the peroxide boils at 65° and normally will distil over with the ether. But sooner or later the combination of circumstances required to cause some ethyl peroxide to remain behind in concentrated form with the sulphur is likely to occur (*e.g.*, a leaking stopper in a Soxhlett apparatus which might allow the ether to distil off very slowly). I still have the distorted iron water-bath which saved me from serious injury when I chanced on such a combination of circumstances when evaporating an ethereal solution of sulphur in an apparatus fitted with a condenser and similar to that described by M. Fassina.

Yours faithfully,

H. F. TAYLOR.
Research Department.

Hardman & Holden, Ltd.,
Manox House,
Miles Platting,
Manchester, 10.

November 26, 1949.

Personal

Mr. **R. F. D. Pawley,** Deputy Works Superintendent of the Plymouth undertaking, has been appointed Engineer-in-Charge at Berwick-on-Tweed.

Mr. **B. H. Harrison,** Chemist and Technical Assistant at Hinckley, has been appointed by the North Western Gas Board, Resident Engineer of the Lymm undertaking to succeed Mr. **T. H. West,** who has retired. Mr. Harrison, who was trained at Rugby, is the son of Mr. E. T. Harrison, Manager of the Lutterworth undertaking.

Mr. **S. Roberts,** Products Salesman of the North Thames Gas Board, retires at the end of this year after more than 50 years' service in the Gas Light and Coke Company and North Thames Gas Board. Mr. Roberts served the whole of his time in the products sales office and had valuable contacts with county and other public authorities concerned with the purchase and use of refined tar. He was closely connected with the development of the progress in direct spraying from bulk road tar tanks. He has been for some years a member of the main councils and many sub-committees of the British Tar Confederation, British Road Tar Association, and the Association of Tar Distillers. He was appointed Products Salesman in January, 1946.

Mr. **Laurence W. Blundell,** M.SC., A.R.C.S., F.R.I.C., D.I.C., A.M.I.CHEM.E., will take over the appointment of Controller of By-Products to the North Thames Gas Board on January 1, and will be responsible both for the manufacturing and selling sides. From 1927-29 Mr. Blundell was engaged as a Research Chemist to the National Federation of Iron and Steel Manufacturers, under the late Professor W. A. Bone, F.R.S., and was awarded the Junior Moulton Medal of the Institution of Chemical Engineers in 1930. He joined the staff of the Gas Light and Coke Company as a Chemical Engineer at the Tar and Ammonia Products Works, in 1929. In 1939 he was placed in charge of the sections of the works dealing with tar distillation and subsidiary processes, and became Deputy Superintendent when the post became vacant in 1945. Following the retirement of Mr. W. G. Adam, Mr. Blundell was subsequently promoted to the position of Superintendent in June, 1946. Since then he has been mainly concerned with the reconstruction of the products works and the shaping of its activities in accordance with the strides made by the tar and by-product industry during the war years.

Obituary

With deep regret we announce the death of Mrs. **Scott,** widow of Mr. J. Winson Scott, who was Managing Director of Messrs. R. and J. Dempster, Ltd., until his retirement a few months before his death in 1947. Mrs. Scott, who was 83, died at the New Malden residence of her son, Mr. Walter Scott.

Diary

Dec. 1.—Demonstration of Infra-Red Cooking by Gas, Radiant Heating, Ltd. Sponsored by the Earl of Limerick, K.C.B., D.S.O., Building Centre, Conduit Street, W.1. 5 p.m.

Dec. 3.—Scottish Junior Gas Association (Western District): Joint Meeting with Eastern District. Paper by A. F. Cottrell (Woodall-Duckham Company), Edinburgh.

Dec. 6.—South Eastern Gas Consultative Council, 4-6, Wandsworth Road, S.W.8, followed by visit to Greenwich works of the South Eastern Gas Board.

Dec. 6.—Wales and Monmouthshire Junior Gas Association: Meeting, Newport. Paper by L. James.

Dec. 7.—Western Junior Gas Association: 'Breeze Briquetting,' D. J. Maunder (Torquay). Demonstration Room, Taunton.

Dec. 7.—Manchester District Junior Association of Gas Engineers: Visit to B.E.G.W.A.C.O. Meter Works, Farnworth. Short Papers for F. Johnson Prizes.

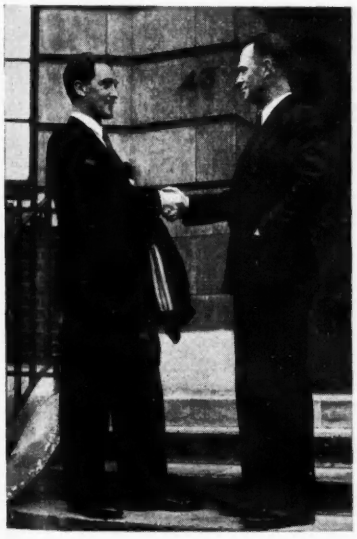
The Queen at Olympia

(*Gas Council Photograph*).

Her Majesty the Queen made a thorough examination of a gas cooker exhibited on the Gas Council's stand during her tour of the Building Exhibition at Olympia.

Ascot's Australian Contacts

In June, 1948, Mr. G. H. Rosam, Overseas Manager of Ascot Gas Water Heaters, Ltd., returned from a visit to Australia during which he carried out a market research for the instantaneous gas water heaters and other appliances manufactured by the Ascot organisation. As a result of his investigation he was convinced that his Company needed a closer link with its Australian interests than was afforded by correspondence, and he therefore proposed to the Board that a resident representative should be appointed in the Commonwealth.



Mr. Gower (left) bidding farewell to Mr. G. H. Rosam on the steps of 43, Park Street, London.

This recommendation was agreed to and Mr. J. A. Gower was selected for the new assignment. Hitherto one of Ascot's 'behind the scenes' sales technicians, Mr. Gower's new duties will enable him to maintain contacts and 'after sales service' throughout the Commonwealth. It is hoped to minimise the feeling of remoteness which exists among many Australian customers of British firms when their sole means of communication is correspondence. Mr. Gower's address will be the Oriental Guest House, 11, Milsom Road, Cremornepoint, Sydney, N.S.W.

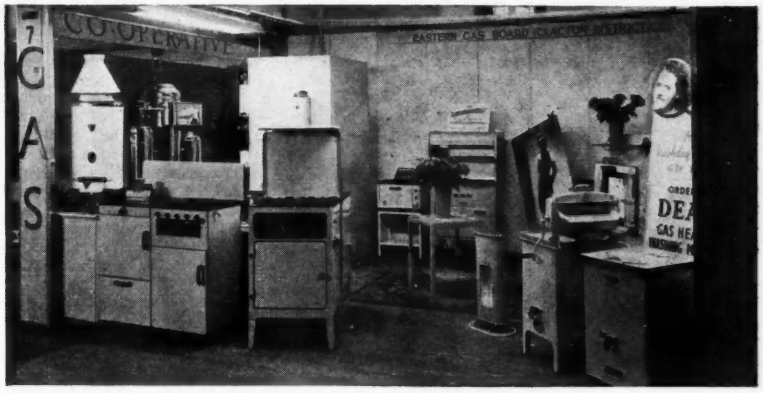
Another Addition to the fleet of the North Thames Gas Board has been launched at Sunderland. The new vessel is the *Samuel Clegg*, and the launching ceremony was performed by Mrs. I. T. Barclay, a member of the Board. The *Samuel Clegg* is a single-screw collier, built by S. P. Austin and Son, Ltd., Sunderland. Its main dimensions are: 260 ft. (between perpendiculars) by 39 ft. 6 in. by 18 ft. 6 in.; deadweight capacity, about 2,700 tons on a draught of 17 ft. 1 in. It has a British Polar eight-cylinder vertical two-stroke single-acting trunk-piston direct-reversible diesel engine, to develop 1,180 b.h.p. at 225 r.p.m., fitted by the North Eastern Marine Engineering Co. (1938), Ltd., Sunderland. Its speed in service is 10½ knots. The holds are self-trimming and single berth cabins are provided throughout for the crew.

Clacton Trade Fair

Sponsored by the *East Essex Gazette* series, Clacton Traders and Industries Fair, held at the Clacton Town Hall from November 16 to 23 was an event of importance in North East Essex and attracted crowds from far and near. The opening ceremony was performed by Wilfred Pickles and Chief Petty Officer Williams, of H.M.S. Amethyst.

Toasts at a civic luncheon were proposed by Mr. Wilfred Pickles and Mr. A. Christiansen, Editor of the *Daily Express*. The luncheon was also attended by the Rt. Hon. Alfred Barnes, M.P., Minister of Transport. Mr. W. J. Collins Garrard, Divisional Manager, Ipswich Division and Mr. Frank Allen, Clacton Group Manager, represented the Eastern Gas Board.

Considerable interest was aroused by the display of gas appliances and also by laundry and cooking demonstrations. During the first portion of the Fair, domestic appliances were shown, and during the second portion the Eastern Gas Board arranged a display of appliances suitable for the hotel and catering industry, one of the main businesses in this coastal area which caters largely for holiday visitors.



The exhibition stand of the Eastern Gas Board at the Fair.

'Shocking Conditions' in the Gas Industry

Colonel H. C. Smith's Candid Comments

COLONEL H. C. SMITH, Deputy Chairman of the Gas Council, spoke plainly about some of his impressions of the first six months of nationalisation at the luncheon which preceded the autumn meeting of the Eastern Association of Gas Engineers and Managers at the Waldorf Hotel, London, on November 25. Responding to the toast of the guests, he said that the industry which they were proud to serve had undergone a major operation. Many of them fought against it as long as they could, until finally someone gave them a dose of anæsthetic and they had to submit. They were now working under entirely different conditions from those which prevailed at the time of the Association's last autumn meeting, and some of them were asking how the new set up was working, and what was going to happen in the future for the industry and for the individuals who served it.

They had been working under the new conditions for about six months, and while they were not in a position to give a complete answer to those questions they were beginning to get some idea as to how the system was going to work. Gas was the third of the industries responsible to the Ministry of Fuel and Power to be nationalised, and each industry had been organised in a different way.

Coal, the first of the nationalised industries, was organised on the basis of one central board stationed in London. The board was the only statutory authority and was given the responsibility of organising and running the industry just as it wished. In the case of the electricity industry there was a central authority responsible for the generation of electricity, with regional or area authorities responsible for the distribution of the current. In the gas industry they had something which was still more decentralised. Each of the 12 area boards had a very large measure of responsibility; it was responsible for the success of the undertakings within its area, and was largely autonomous. Together with the Chairman and Deputy Chairman of the Gas Council, the Chairmen of the 12 area boards constituted the Gas Council. Here was a set up that was typical of the way the industry had always worked in the past. There had been separate undertakings but they had got together on a voluntary basis in their national and district organisations to pool their knowledge and do their best for the individual undertakings and the industry at large.

Individual Responsibility

They were in effect now doing the same thing under statutory powers. The Gas Act was really like a book of rules, and the success of the whole organisation depended on the individuals who were responsible for carrying them out. The Eastern Association represented a large body of the individuals who would be responsible for the success or otherwise of the gas industry under the new constitution.

Together with the Chairman of the Gas Council he had in recent months had the opportunity of visiting several undertakings and of examining the position in them, and quite frankly he had been shocked with what he had seen. It was no good hiding the facts from themselves. The way to develop in the future was to be honest with themselves. They might not like the new organisation, for political or other reasons, but there it was, and it had to be worked, and they must be perfectly honest with themselves. Many parts of the industry had cried out for something in the nature of nationalisation; until the last few months he had not realised it to the extent that he realised it now.

He was not referring only to the small undertakings. They had in their Association representatives of contracting firms, some of whom he was convinced had known the truth about the industry probably to a greater extent than those on the production side. Gas engineers and managers had seen the industry very largely as the result of visits to one another's works. They had seen it as the result of visits to the works of the President of that or other of the District Associations. Such works were obviously not the worst works in the district, and thus they had formed a wrong impression of the state of the industry as a whole, imagining perhaps that other works were being conducted as efficiently as those which they had been privileged to see.

Face the Facts

That was not so, and there was a terrific amount of work to be done in the future, and that work would depend very largely on the way in which they and the members of the other District Associations applied themselves and pulled their weight. They had this new organisation and they had to make it work, and the sooner they faced the facts of the position as it was today the better it was going to be for the industry and those engaged in it.

On the other hand one found undertakings, small as well as large, in which there was evidence of great skill in administration and great skill on the part of the executive, and great enthusiasm on the part of everybody concerned, and they were a shining example to some of the others. It was up to all of them to see that the poorer undertakings were brought up to the state of efficiency of the good ones. The responsible heads of some undertakings had taken the line that whether nationalisation came or not they were going to be ready to hand over something that was highly efficient. Others quite obviously had sat back and said that if the industry was going to be nationalised somebody else could get on with it. That might have been done for political reasons, or because some people were inefficient, or possibly out of pure laziness. The task that lay before them was to see that such undertakings were brought up to the same standard of efficiency as the good ones.

Schemes of large-scale integration could not be accomplished for some time. It was common knowledge, from Parliamentary transactions and from the pronouncements of the Prime Minister and the Chancellor of the Exchequer, that capital programmes were being curtailed and there were difficulties in securing materials. Quite obviously large-scale integration was a long way off, but there was a lot that could be done on a small scale to improve the position. The area boards must do it entirely by themselves, but they could not do it without the enthusiastic support of the engineers and managers, which he was sure they were going to get.

No Lack of Enthusiasm

In going round the country he had met all sorts of gas engineers and officials and he had found tremendous enthusiasm. In some cases he had spoken to people who had resented very much the new organisation of the industry, but in every instance they had admitted that they could not help it and they were determined to see that the industry progressed, and were going to be just as enthusiastic in the future as they had been in the past. The present and future organisation of the industry was going to give opportunities to many people engaged in the industry such as they had never enjoyed in the past. It was up to everyone to prepare himself to take advantage of such opportunities and to be ready to accept increased responsibilities which might at any time fall on him. There was a tremendous amount of work to be done which would call for the skill and energy and enthusiasm of everyone concerned in the industry.

Mr. **H. H. Redwood,** Junior Vice-President and Secretary of the Association, had proposed the toast to which Colonel Smith responded and had extended a special welcome to Mr. F. M. Birks, Senior Vice-President of the Institution of Gas Engineers; Colonel Smith, Deputy Chairman of the Gas Council; Mr. J. H. Dyde, present in a triple rôle as Deputy Chairman of the Eastern Gas Board, Junior Vice-President of the Institution, and President of the Southern Association of Gas Engineers and Managers; Major C. Hyde, Under-Secretary, Ministry of Fuel and Power; Mr. G. W. Izard, Regional Director; Dr. W. T. K. Braunholtz, Secretary of the Institution; Mr. J. T. Brookes and Mr. H. R. Hilham, President and Secretary respectively of the Eastern Junior Gas Association; and the successful students from the area in the 1949 examinations of Institution of Gas Engineers.

Mr. **F. M. Birks,** Senior Vice-President of the Institution, proposed the toast of the Association and apologised for the absence of Mr. C. H. Chester, President of the Institution. The Association, now in its 61st year, had been a factor in promoting a sense of unity among gas engineers in a large section of the country where a large proportion of the undertakings were small and because of the relatively sparse population the distances between them was considerable. It had afforded its members opportunities to meet at regular intervals not only

Rail versus Sea Borne Coal

Gas Consultative Council Suggests Economies

COUNCILLOR MRS. W. KADER, Deputy Chairman, presided at a meeting of the North Thames Gas Consultative Council at St. Ermins Hotel, Westminster, on Thursday, in the absence through illness of Councillor E. Bayliss, Chairman, to whom a message of good wishes for speedy recovery was sent.

The chief business was the appointment of members of the district committees to be set up under a scheme approved by the Minister of Fuel and Power. Four district committees were appointed, covering the areas (a) Berkshire and Buckinghamshire; (b) Middlesex and Surrey; (c) Metropolitan area; and (d) Essex; to consider the particular circumstances and requirements of their localities with respect to the supply of gas, to make representations thereon to the consultative council, and to be available for receiving on behalf of the consultative council representations from consumers in their localities.

Annual Elections

The district committees consist of not less than six nor more than 15 members, excluding *ex officio* members, of whom not less than half are members of local authorities within the districts. The others are from associations representing industry and commerce, including co-operative societies, representatives of organised labour, and representatives of women's organisations. Members hold office for one year and are eligible for re-appointment. Each district committee will appoint its own chairman and deputy chairman, who will hold office for a year and will be eligible for re-election.

The Secretary, Mr. W. Elliott, reported replies from the North Thames Gas Board to questions raised at the previous meeting of the consultative council. A request had been made for statistics relating to the proportions of sea and rail borne coal carbonised by the board. It was estimated that the total amount of coal treated during the year ending April 30, 1950, would be 4,576,000 tons, of which 1,188,000 tons, or 26%, would be rail borne, and 3,388,000 tons, or 74%, would be sea borne.

Winter Outlook

The consultative council had asked whether there was likely to be any considerable variation in pressures during the winter, due to shortages of gas or other causes. The board replied that unless the weather was abnormally severe it hoped to be able to meet normal requirements without reductions of pressure, but if conditions became anything like those which prevailed at the time of the fuel crisis early in 1947 there might be some difficulty in maintaining full pressures at all times.

Information had been sought regarding the board's policy on the question of charges for meter rentals. On this subject the board had stated that the matter would be discussed at a meeting of the board, at which Councillor Bayliss, Chairman of the consultative council, would be present as an *ex officio* member. A meeting had been held within the last few days, but owing to the illness of Mr. Bayliss the question had been deferred.

Another question related to the limits of variation in the calorific value of gas supplied by the board, and the basis of average calorific value for the quarter as shown in the quarterly returns presented to the consultative council. The answer to this was a citation from the Gas Regulation Act, 1920, providing that 'if on any day for a period of two hours or upwards the calorific value of gas supplied by any undertakers, ascertained in accordance with the provisions of the Act, is more than 5% below the declared calorific value, the undertakers shall be liable to a forfeiture not exceeding £5 for every complete 1% by which the calorific value is deficient in excess of such 5%.'

The Secretary added the comment that in most instances the actual calorific value was slightly above the declared value. There were recording instruments at all the manufacturing stations.

Coal Freights

The council discussed at some length the question of coal transport costs. While it was accepted that the charges for sea borne coal were considerably below those for rail borne traffic it was emphasised that even on present statistics more than one-fourth of the total requirements came by rail, and under war conditions the proportion might be much greater. It was felt that, as one nationalised industry negotiating with another, the board might explore the possibilities of securing 'agreed charges' from British Railways for the conveyance of rail borne coal—charges which might well be lower than the present standard rates. A formal resolution asking the board to explore the possibilities was passed.

Colonel H. C. Smith — continued from p. 520

to discuss technical and other matters, but also to form friendships within the industry. It might well be that under the new proposal to absorb District Associations into district sections of the Institution some of the members would feel they might lose something of their identity, but he could not help feeling that when the change came about it would not only strengthen the Institution but would afford a very considerable degree of strength to the Association.

Mr. **C. E. Grimwood,** President of the Association, responding, said it was probable that he would be the last President, and that his successor would be the Chairman of the Eastern District of the Institution, but he was sure that whatever form it took, the Association had a long and useful life before it. If the Eastern Association was not as old as some of the kindred associations in the matter of years it was just as old in tradition, and one of the things of which they were proud was the spirit of friendship among the members. The first object in its first constitution was 'to promote the fellowship of its members,' and that object was again incorporated in the revised constitution which the Association adopted in 1945. One of their characteristics, as one of his former directors had rightly observed, was that they had no trade secrets but were willing to show everybody everything they did. He suggested that a little more of that spirit would be a good thing for the world at large.

He recalled that he was articled to the late Mr. W. W. Townsend during his Presidential year, 1920. One of his earliest recollections was that of trying to pick out his father in a group of members of the Association photographed at Chelmsford in 1903. He was proud of the fact that his grandfather, Charles William Grimwood, was installed as President of the Association as early as 1895, and he was glad to welcome on the present occasion his father, now father of the Association, having been a member since 1891, Chairman of his old Company under whom he had had the pleasure of serving for 17 years.

Enquiry for Gas Meters

The United Kingdom Trade Commissioner at Vancouver has been approached by Mr. Harry B. Armstrong, Vice-President of Western Supplies, Ltd., 108th Street and 103rd Avenue, Edmonton, Alberta, regarding United Kingdom sources of supply of gas meters for use with natural gas. Mr. Armstrong has pointed out that the sizes of meters sold in Canada are 5B, 10B, 20B, 30B, and larger. The type required would be 'iron case.'

Western Supplies, Ltd., are wholesale jobbers and importers of plumbing and heating supplies who have been known to the United Kingdom Trade Commissioner's office in Vancouver for some considerable time. United Kingdom firms interested in pursuing this opening should write direct to Mr. Armstrong at the address quoted.

The Commercial Relations and Exports Department of the Board of Trade will be pleased to hear of any action taken, reference C.R.E. (IB) 33671/49 being quoted in this connection.

A Correction

In the 'Journal' of August 24 (p. 476) we published photographs of the kitchens in the civic restaurants opened by the London County Council at Stoke Newington and Islington. Subsequently we were informed that the equipment illustrated was supplied by Rowe Bros. & Co., Ltd., and manufactured by the Hygienic Stove Co., Ltd., and we published a note to this effect, in all good faith, in our issue of September 14, p. 644. It has now been explained to us by James Stott & Co. (Engineers), Ltd., that the whole of the equipment shown in our photographs was in fact supplied by them and that for the most part the appliances were in fact manufactured by this firm. We hope that undue confusion has not arisen as a result of our previous statement.

Meeting the Load at Stoke-on-Trent

Inauguration of New Gasholder

THE new 5-mill. waterless gasholder at the Etruria works of the Stoke undertaking was officially inaugurated on November 3, by Alderman Percy Williams, J.P., former Chairman of the Stoke-on-Trent Gas Committee. The holder will bring the storage capacity of the undertaking to 13,715,000 cu.ft., the equivalent of a little over 15 hours of demand at the present rate. The overall height of the holder is 260 ft. and its diameter 175 ft., and over 1,020,000 rivets were used in its construction.

Inauguration of the gasholder by Alderman Percy Williams. Also in the picture (left to right) are Mr. G. A. Matthews, Deputy Chairman of the West Midlands Gas Board; Mr. A. E. Hewitt, member of the Board; Mr. Charles Dempster; Mr. J. E. Stanier, Divisional Manager, North Staffs Division; Mr. G. le B. Diamond, Chairman of the Board; Mr. J. S. Warrillow, Engineer and Manager, Stoke-on-Trent District; Mr. H. Taylor, Town Clerk; and Alderman, G. L. Barber, Vice-Chairman of the former Gas Committee.

Work on the holder commenced in 1939 when the foundations were put in hand, but after these were completed the work was suspended during the war, and it was not recommenced until 1945. In 1939 the gas sold by the undertaking was 3,000 mill. cu.ft.; at the present time it is over 6,000 mill.

Although considerable extensions have been made to the Etruria works during this time, including a 6-mill. cu.ft. per day Glover-West carbonising plant, coal and coke handling plant, and coke hoppers, along with all ancillary plant (including detarrers, condensers, exhausters, engine houses, &c.), and a 6-mill. cu.ft. per day carburetted water-gas plant, the capital per mill. cu.ft. sold has actually decreased from £244 to £196 from 1939 to 1949.

Much of the work comprising these extensions was carried out under the auspices of the former owners (the Stoke-on-Trent Corporation), and it was in recognition of this fact that the Chairman of the former Gas Committee, Alderman Williams, was asked by the West Midlands Gas Board to perform the ceremony of inauguration.

After the ceremony, the guests made an inspection of the recently-completed extensions, and later were entertained to lunch at the North Stafford Hotel on the invitation of the West Midlands Gas Board.

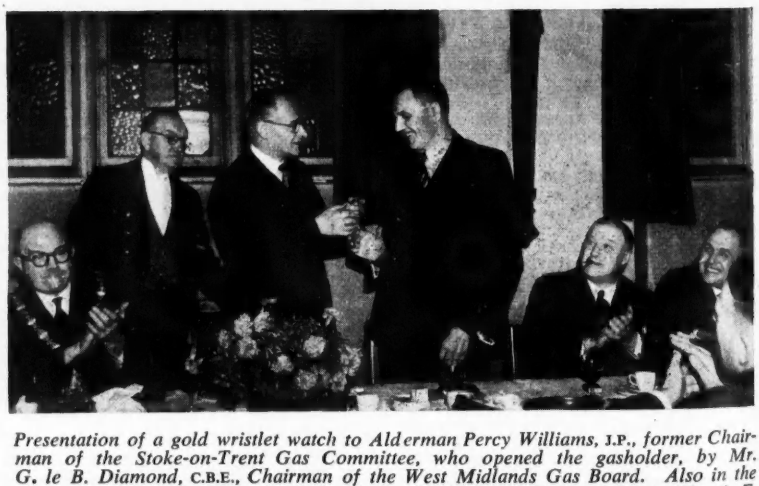
The toast of 'The City of Stoke-on-Trent' was proposed by Mr. **A. E. Hewitt,** M.C., J.P., member of the West Midlands Gas Board, President of the North Staffordshire Chamber of Commerce, and Managing Director of W. T. Copeland and Sons, Ltd., china manufacturers, who said that a great deal of assistance had been given to the progress of the city by the gas undertaking, in meeting the exceptional demands for gas. Some assistance in this respect had been given by the supplies of coke oven gas, first from the Shelton coke ovens, and later from those at Birchenwood. In the ceramic industry, due to rising costs of labour, coal, &c., manufacturers had been forced to modernise their plants, and the help and vision of the gas and electricity authorities had made it possible for the gradual replacement of the old-fashioned intermittent 'bottle' ovens by continuous methods of firing. He thought this was the biggest and quickest change which had taken place in an industry since the days of the Industrial Revolution.

Responding, the Lord Mayor (Alderman Dr. **A. P. Spark,** J.P.) said that the erection of the new gasholder was a monument to the vision of the local Council.

The toast of 'The West Midlands Gas Board' was proposed by Alderman **Percy Williams,** J.P., who referred to the highly creditable work which had been done in the past few years in the development of the undertaking under the auspices of the former Gas Committee, of which he had been Chairman for a number of years.

The expansion began in 1932, when the first continuous tunnel fired by town gas was laid down by a local pottery manufacturer. As a result of this successful venture, several more tunnel kilns were erected, and by 1936 there were 10 in operation. Coke oven gas supplies, which were first taken in September, 1935, enabled the Committee to offer gas at very attractive rates, so much so that by 1937 there were 32 kilns in operation, using 515 mill. cu.ft. of gas. When war broke out in 1939 there were 66 gas-fired continuous kilns in operation, consuming 1,341 mill. cu.ft. a year. This represented nearly 50% of the total gas sold by the undertaking.

During the war years, with development work almost at a standstill, the demands of the pottery industry were appreciably at the same rate until the end of the war, and from that time the undertaking's growth had only been



Presentation of a gold wristlet watch to Alderman Percy Williams, J.P., former Chairman of the Stoke-on-Trent Gas Committee, who opened the gasholder, by Mr. G. le B. Diamond, C.B.E., Chairman of the West Midlands Gas Board. Also in the picture are Alderman Dr. A. P. Spark, Lord Mayor of Stoke-on-Trent, Mr. A. E. Hewitt, member of the West Midlands Gas Board, and Alderman H. Beresford, Deputy Lord Mayor.

On the left is an exterior view of the attractive new building housing the new Humphreys and Glasgow carburetted water gas plant at Torquay, the ultimate output of which will be over 5 mill. cu.ft. of gas per day. The photograph on the right shows the erection of temporary offices at the Hollacombe works. The buildings are of the pre-cast type, capable of speedy erection.

limited by the rate at which new plant could be erected. They were now supplying gas to the local staple industry at the rate of 3,100 mill. cu.ft. per annum, or nine mill. cu.ft. per day, and further large extensions were already in hand in an endeavour to keep pace with the demand.

During the last few years, the Gas Committee had been particularly fortunate in the co-operation which had existed with the contractors. Their efforts had been highly appreciated, both by the Gas Committee and by the Chief Engineer and General Manager, Mr. Stanier. He wished to thank all the contractors, but in particular Messrs. R. & J. Dempster, Ltd., who had been responsible for the erection of the new 5-mill. cu.ft. gasholder.

The West Midlands Gas Board was particularly fortunate in having acquired, at Stoke-on-Trent, a gas undertaking which was extremely virile. To have doubled its output in seven years was an exceedingly fine achievement, and credit should be given to the staff of the undertaking.

'I know,' Alderman Williams continued, 'that the West Midlands Gas Board has taken under its wing a body of men who will serve it well, if it can rely on such sterling qualities which it has been the good fortune of the Gas Committee to have at its disposal during the past few years.'

He congratulated the Chairman, Deputy Chairman, and the members of the West Midlands Gas Board on the exceedingly smooth transition which had marked the transfer of the Stoke-on-Trent Gas undertaking to the new régime.

The emphasis which had been laid on industrial gas developments tended to leave in the background the 62,000 domestic consumers which the undertaking served. Their demand for gas was, nevertheless, increasing year by year, and the domestic consumer was now using 70% more gas than before the war.

They were particularly fortunate in their area in having Mr. Diamond and his fellow-members of the West Midlands Gas Board, and he was sure that under their wise leadership the Stoke-on-Trent undertaking would prosper.

Responding, Mr. **G. le B. Diamond** C.B.E. (Chairman of the board), said that in the Stoke undertaking the board had one of the finest in the whole area. They were particularly pleased, he said, to have the services of Mr. J. E. Stanier as Divisional Manager for the North Staffordshire Division.

Mr. Diamond read a message from Sir Francis Joseph, who was unable to be present; in this he paid tribute to Mr. Stanier on the application of his talents to an industry which had won a gallant fight in maintaining its place in the industrial make-up of the Potteries.

Sheffield's Record Send-out

The Chairman and Deputy Chairman of the Gas Council, Sir Edgar Sylvester, K.B.E., and Colonel H. C. Smith, C.B.E., paid a three-day visit to the East Midlands Gas Board, arriving in the area on November 14. They visited the Aylestone gasworks at Leicester, and later met all the members of the board and a number of the senior members of the board's staff.

They paid a brief visit to Derby and then went to Sheffield. Here again, the senior members of the staff met the visitors, who were visiting the area at the invitation of the board.

In honour of the occasion, an informal lunch party was held at Sheffield, at which the Lord Mayor, the Master Cutler, and a number of leading citizens of Sheffield, including representatives of Sheffield industry, were present. Sir Edgar Sylvester and the Chairman of the board addressed the party after lunch, and during their remarks it was disclosed that an all-time record in the quantity of gas sent out at Sheffield had been established on November 7, and that during that week the quantity of gas sent out during the five working days exceeded the quantity supplied during the corresponding week of the previous year by more than 4 mill. cu.ft. per day. The greater part of this increase was achieved by increased production from the works, but just over 500,000 cu.ft. per day of extra gas was received from the coke oven gas grid.

Photo: Sheffield Telegraph & Star.

Colonel H. C. Smith, Deputy Chairman of the Gas Council; Sir Edgar Sylvester, Chairman of the Gas Council; Mr. H. F. H. Jones, Chairman of the East Midlands Gas Board; Alderman Mrs. G. Tebbutt, Lord Mayor of Sheffield; Major-General Sir Noel G. Holmes, Chairman of the North Eastern Division of the National Coal Board; and Mr. W. R. S. Stephenson, the Master Cutler, at an informal lunch party held at Sheffield in the course of the visit.

EASTERN DISTRICT TAR BOARD

AT the recent annual meeting of the Eastern District Tar Board about 48 surveyors and members met for luncheon at the Angel Hotel, Peterborough.

The Chairman, Mr. **J. Hunter Rioch,** Divisional General Manager of the Cambridge Division of the Eastern Gas Board, in proposing the toast of 'The Guests' said that the area of the Eastern District Tar Board had recently been extended to include the southern part of the area of the former Sheffield and Lincolnshire District Tar Board. While it was the board's policy to send invitations to surveyors all over its area, Peterborough had been chosen for the annual meeting this year for the first time in order to give an opportunity for surveyors in the newly absorbed part of the area to join with the members.

They were particularly honoured by the presence of Colonel H. C. Smith, D.L., C.B.E., whom they greeted as President of the British Road Tar Association. No one was more fitted to hold that high office and the Association was very fortunate indeed to have him as their President and they were grateful to him for sparing time from his many duties as Deputy Chairman of the Gas Council to be present that day. They were also fortunate in having with them Mr. J. H. Dyde, Deputy Chairman of the Eastern Gas Board.

Mr. **A. Morwood,** Surveyor to the Isle of Ely County Council, responded to the toast and said that the surveyors greatly appreciated the luncheon meetings and the opportunity to discuss with the producers of tar and the technical advisers from the British Road Tar Association Headquarters.

At the annual meeting which followed, Mr. J. Hunter Rioch was re-elected Chairman, and Mr. R. A. Weston (Norwich) and Mr. E. H. Winch (Cambridge) were elected Vice-Chairman and Secretary, respectively.

Work of the B.R.T.A.

Colonel **H. C. Smith,** President of the British Road Tar Association, thanked the members and guests for the welcome extended to him and then dealt with achievements of the Association in its two-fold function of assisting road tar manufacturers and the suppliers of road tar materials on the one hand, and users of the material on the other.

As regards tarmacadam and tar carpets, reference had been made last year to a durability test for tar which it was hoped would enable the suitability of a particular tar to be pre-determined. Further progress had been made, and a number of the member-firms of the Association were trying out, in their own laboratories, the test which had been evolved in the Road Research Laboratory When the test procedure had been co-ordinated the next step would be to correlate the laboratory test with road behaviour and it was hoped that this step would be reached in the course of a few months. The British Standard Specifications provided for three types of tar: A, B and C. The question arose as to whether it was desirable to stipulate that a type B tar should be used for the manufacture of tarmacadam. The conclusion had been reached that while, in general, it was better to use a type B tar to meet ordinary requirements for this material, satisfactory results have been obtained with type A tar. The answer to the particular type which was suitable in a specified case was to be found in close co-operation between road tar supplier and the tarmacadam manufacturer.

Hot process tarmacadam, sometimes called dense tar surfacing, had proved its worth as a material of satisfactory performance and durability. It consisted of a mixture of coarse and fine aggregate, filler and high viscosity tar. The proportions were selected to provide a dense impervious material having good mechanical and weather resisting properties. There was a need for this material to be more widely known and the Association was engaged upon the preparation of notes incorporating typical specifications

Surface dressing, he continued, had reached a high standard of performance. The great problem was to find a satisfactory wetting agent. It would be an advantage to supplier and user alike if a road could be surface dressed without having to forecast whether the work would subsequently suffer by heavy rain.

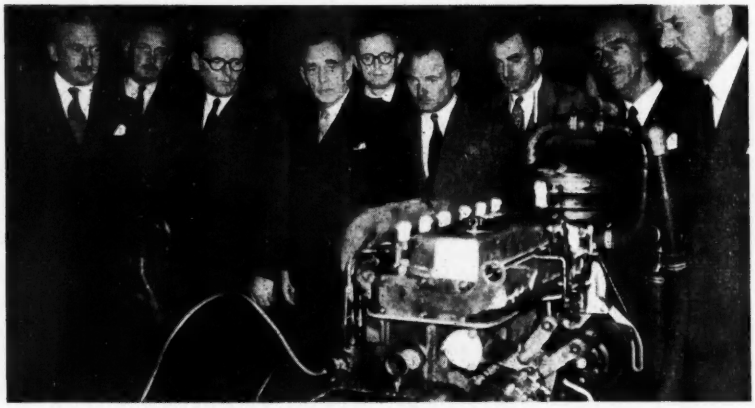
Re-Tread Process

Colonel Smith then referred to the process which had been known for many years as grouting but which had been brought to notice more prominently in the last year or so as a 're-tread process.' There was no doubt that on roads carrying a lesser volume and weight of traffic, and where re-shaping was necessary, it provided an economical substitute for the more expensive process of laying a carpet. It was necessary to exercise discretion as to the circumstances under which it would be a sound proposition, and the Association has prepared a leaflet for distribution on request to those who intend to adopt this form of treatment.

Colonel Smith referred to the Association's quarterly journal 'Road Tar' and to the Certification Trade Mark which had now become firmly established. Licences covered 71 works in all parts of Great Britain. The tonnage of certified tar sold under this scheme had risen from 192,000 in 1946 to 340,000 in 1948. It now represented two-thirds of all the road tar sold in the home market.

Altogether some 30,000 booklets had been issued by the Association since the end of the war. Work was proceeding on an ambitious project which would take some time to complete—a comprehensive publication to be entitled 'The Construction and Maintenance of Roads with Tar.'

In conclusion, Colonel Smith said that the B.R.T.A. membership consisted of some 740 gas undertakings, some 35 coke oven undertakings, and some 30 or more distillers—a total membership of over 800 producers and distillers, many of which operate several plants in various parts of the country. One and three-quarter million tons of crude tar and nearly half a million tons of road tar were produced by the members of the Association last year.



Colonel H. C. Smith, President of the British Road Tar Association and Deputy Chairman of the Gas Council, with Mr. J. Hunter Rioch, Chairman of the Eastern District Tar Board, and Mr. R. A. Weston, Vice-Chairman, and other members and guests watching a Perkins P6V diesel engine under test.

Mr. **R. A. Weston** proposed a vote of thanks to Colonel Smith.

Review of Tar Surfacing

Mr. **W. E. Cone,** Technical Adviser, to the B.R.T.A., briefly addressed the meeting and said that they were always glad to learn the practical viewpoint of the surveyors. Reviewing the various forms of tar surfacing, he said that dense tar carpets existed which were continuing to give good service after ten years. Hot process tarmacadam or dense tar surfacing generally give the best results on a life for cost basis. He was sure the B.R.T.A. could give much valuable service in co-operating with suppliers and users of road tar in the joint investigation of road surface work.

At the conclusion of the meeting the members and their guests visited the diesel works of Messrs. F. Perkins at Newark, Peterborough, which is the largest of its kind in the world. High speed diesel engines were seen in all stages of production in a very modern factory, organised on the most efficient lines. The visitors were joined at tea by the Chairman and Managing Director, Mr. F. A. Perkins.

Gas Values and Conversion

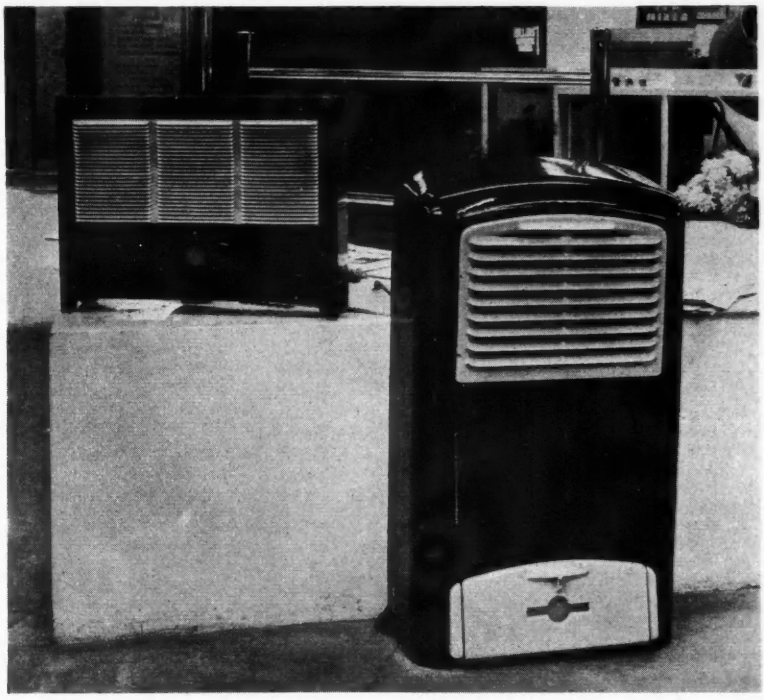
AN order which accompanied the following new list of gas valuations, published by the Ministry of Fuel and Power on November 21, provides for the immediate conversion of securities of gas undertakings for which valuations have been issued since September 19. The conversion date, it will be recalled, was postponed to allow the Gas Council to make administrative preparations for the payment on November 1 last of six months' interest on unvalued stocks. The announcement affects the five most recent lists which have been published in the *Journal* on September 28, October 5 and 19, and November 9, and below. The compensation value of these stocks amounts to approximately £51.2 mill. and raises the total of British gas stock issued to date to £177.2 mill. Where interest paid on November 1 for securities included in the new list and in that published on November 1 was not sufficient to meet the full six months' interest, a further payment is to be made on or about January 17 to holders at the close of business on September 26. These payments will be made by the Gas Council on the direction of the Minister. The price of British Gas stock now stands around 88, following the recovery of the Funds which commenced with the appearance in the market of the Government broker on November 11. On the previous day the stock had reached its lowest point of 83. Two exceptions have been announced in regard to the conversion date for stocks included in the five latest lists; the date for conversion has still to be announced for the 4% redeemable debentures of the former Stowmarket Gas Light and Coke Company, and for the 3½% redeemable debenture stock of the former East Surrey Gas Company. The list below contains 99 securities of 37 companies.

Company	Compensation Value
Albrighton Ord. (£1 unit)	30/-
Arundel 4½% Irred. Deb.	£113
Banbury 4½% Perp. Deb.	£112/10/-
Do. 4½% Pref.	£109
Do. Orig. Ord. (£10 unit) ...	£20/10/-
Do. New Ord. (£10 unit) ...	£14/10/-
Bewdley Ord. (£1 unit)	41/-
Brechin 5% Pref. (£10 unit)	£11/10/-
Do. Ord. (£1 unit)	65/-
Bruton 6% Pref. (£1 unit)	26/5
Do. Ord. (£1 unit)	46/-
Burgess Hill and St. John's Common 5% Red. Pref. (£5 unit) ...	£5/5/-
Do. Orig. Ord. (£5 unit)... ...	£10/5/-
Do. New Ord. (£5 unit)	£7-5/-
Clay Cross 10% Max. Ord. (£1 unit)	42/-
Do. 7% Max. Ord. (£1 unit) ...	30/-
Denby Dale Ord. (£1 unit)	35/-
East Cowes 4% Perp. Deb.	£102
Do. Orig. Ord.	£210
Edenbridge 6% Irred. Deb.	£145
Do. 4% Irred. Deb.	£102
Do. Ord.	£145
Fordingbridge Ord. (£5 unit) ...	£6/10/-
Garw and Ogmore 5% Pref. (£10 unit)	£11/4/-
Gas Light and Coke 4% Consol. Pref.†	£105/10/-
Do. 3½% Red. Pref.†	£104/5/-
Do. 3½% Max.†	£95
Do. Ord. (£1 unit)†	26/6
Golborne Ord. (£10 unit)	£13/10/-
Do. Ord. Half Shares (£5 unit) ...	£6/15/-
Guisborough Ord. (£10 unit) ...	£19/5/-
Haywards Heath 5% Perp. Deb. ...	£125
Do. 5½% Irred. Pref.	£128/10/-
Do. 4½% Irred. Pref.	£110
Do. Ord.	£174
Howden Ord. (£10 unit, £7 paid) ...	£19
Langport, Huish and Curry Rivel 5% Cum. Pref. (£1 unit)	23/-
Mere Pref. (£1 unit)	22/8
Do. Ord. (£1 unit)	41/-
Montrose Ord. (£1 unit)	58/-
Newquay (Cornwall) 6% Deb.	£146
Do. 5½% Deb.	£142
Do. 4½% Deb.	£112/10/-
Do. 6% Pref. (£1 unit)	26/8
Do. Orig. Ord. (£1 unit)... ...	40/-
Do. Addl. Ord. (£1 unit) ...	28/-
Oundle Ord. (£5 unit)	£10
Pocklington Ord. (£10 unit)	£13/4/-
Ripley 6% Addl. Pref. (£5 unit) ...	£6/14/-
Do. 5% Orig. Pref. (£5 unit) ...	£5/14/6
Do. Ord. (£5 unit)	£14/10/-
Rowley Regis and Blackheath 4% (Tax Free) Red. Deb. ...	£101/5/-
Do. 5% Red. Deb.	£100/15/-
Do. 4% Red. Deb.	£100/5/-
Do. Ord. 'A' (£10 unit)	£20/10/-
Do. Ord. 'B' (£10 unit)	£14/12/-
Salisbury 5% Deb.	£125
Do. 4% Deb.	£102/10/-
Do. 6% Pref. £12 10s. unit) ...	£16/12/6
Do. 5% Pref. (£12 10s. unit) ...	£14/1/3
Do. 10% Max. Ord. (£12 10s. unit)	£25/14/7
Do. 8% Max. Ord. (£12 10s. unit)	£20/15/-
Do. 7% Max. Ord. (£12 10s. unit)	£18/5/-
Do. 6% Max. Ord. (£12 10s. unit)	£16
Do. 5% Max. Ord. (£12 10s. unit)	£13/18/9
Saltash 4½% Red. Deb. (£50 unit) ...	£50/5/-
Do. 4½% Red. 'B' Deb. (£25 unit), before Jan. 1, 1946 ...	£25/2/6
Saltash 5% Pref. (£5 unit)	£5/13/-
Do. 5% 'B' Pref. (£5 unit), before Jan. 1, 1946	£5/12/-
Do. Ord. (£5 unit)	£9/10/-
Sherborne 5% Pref. (£5 unit) ...	£5/12/6
Do. Ord. (£5 unit)	£6/7/6
South Yorkshire & Derbyshire Orig. Ord.	£157
Do. Addl. Ord.	£157
Strathmiglo Ord. (£1 unit)	33/4
Taunton 5% Irred. Deb.	£125
Do. 5% Irred. Deb., 1897 ...	£125
Do. 5% Pref.	£114
Do. 4% Pref.	£102/10/-
Do. 5% Red. Pref., 1954 ...	£105
Do. 4% Red. Pref., 1962-67 ...	£102/10/-
Do. Consol 'A'	£167
Do. New, 1897	£145
Do. Yellow (£5 unit)	£7/5/-
Torquay and Paignton 4% Irred. Deb.	£102/10/-
Do. 5% Pref.	£114/10/-
Do. 4% Red. Pref.	£101
Do. Ord.	£139
Whittlesey 5% Deb.	£124
Do. 5% Pref. (£10 unit)	£11/4/-
Do. Ord. (£10 unit)	£20
Wincanton 6% Cum. Pref. (£1 unit), before Jan. 1, 1946	26/5
Do. 6% Cum. Pref. (£1 unit), since Dec. 31, 1945	22/-*
Do. Ord. (£1 unit)	58/6
Witney 5% Pref. (£5 unit)	£5/12/6
Do. 5% Pref. (£1 unit)	22/6
Do. Ord. (£5 unit)	£7/5/-
Wyvenhoe 5% Pref. (£5 unit) ...	£5/12/-
Do. Ord. (£5 unit)	£5

* The value of these securities has been determined by reference to the price of issue in accordance with Section 25 (6) of the Act.

† The value of these quoted securities is the value for the purposes of Section 25 (2) of the Act as increased by direction of the Minister in accordance with Section 26 (1) of the Act.

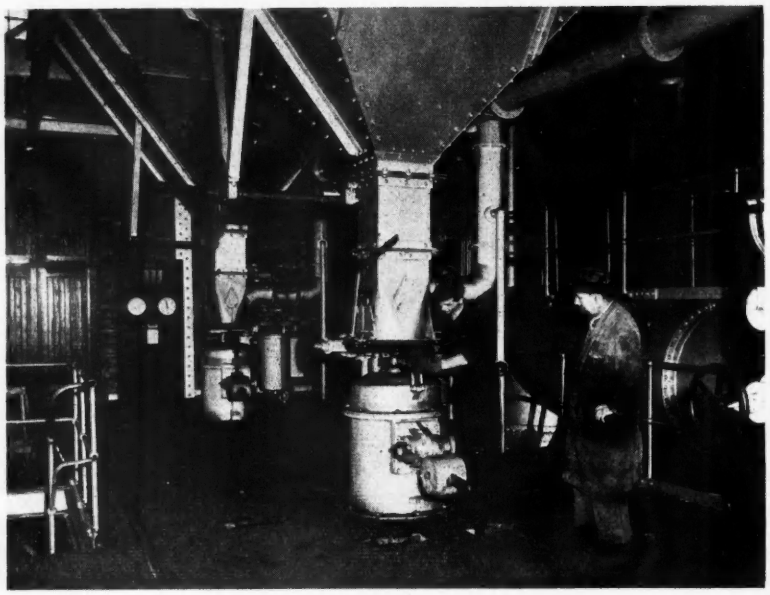
SEEN AT OLYMPIA



At the Building Exhibition Radiant Heating, Ltd., has a section of the stand of Ascot Gas Water Heaters, Ltd. Our photograph (taken at Olympia) shows, on the right, a 'Floortherm' heater and, on the left, a 'Startherm.' The exhibition, which was described in our issue last week, ends tomorrow.

RECONSTRUCTION AT BARNET GASWORKS

The first part of the reconstruction scheme being carried out at the Barnet works of the Eastern Gas Board is now in operation. First considered during the war, this project was designed to cover the anticipated increase in gas consumption when war ended, and to replace old and out-moded plant.



Closing the producer charger on the new plant at Barnet.

A scheme which was expected to be sufficient cover for 10 years was evolved, and alternative types of plant considered. The ground space was limited to that occupied by existing buildings, and it was finally decided to install Gibbons horizontal chambers, which would give approximately the same coal throughput as a vertical installation covering the same floor area.

When completed the carbonising plant will consist of eight beds of four-tier chambers, three per tier, giving an output of three mill. cu.ft. of gas per day. The settings will be fired by hot produced gas, made in external self-clinkering units housed in a separate section of the retort house.

This portion of the scheme is being undertaken in two stages. The producer house and plant and the first three beds of chambers were erected on the site available after demolishing half of the old No. 1 retort house and the waste heat boiler house. The second stage of the scheme will be done now the first is at work, and the other half of the old No. 1 section will be shut down and the last four settings built.

The first item of reconstruction, a new coke plant of 300 tons capacity, was erected alongside the old coke plant which has now been demolished. The plant is equipped with a coke cutter of up to 30 tons per hour capacity, and horizontal reciprocating screens with balanced overdrive. The coke is brought to the plant by a twin skip hoist of the fully automatic type, unbalanced, each skip of 1-ton capacity being independent of the other and dealing with 20 tons each per hour. Provision has been made in the construction of the plant for a conveyor to be carried across the road to supply coke to the C.W.G. plant which is opposite. The coke for this purpose is at present taken over manually and raised by electric hoist.

The carbonising plant is equipped with producer gas mains and controls on both sides in the cellar, and can be fired from either side independently. The chambers have a capacity of 22 cwt. of coal per charge, put in by a projector type machine discharging through a coke bus on the discharging side into the trough, the bench being fitted with Congdon stand pipes with the usual type of fittings. The carbonising period will be 12 hours.

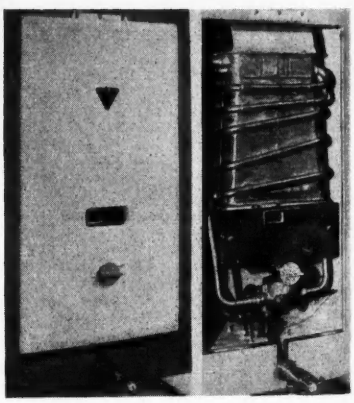
Record export sales are reported by the Chaseside Engineering Co., Ltd., for the second year running. Last year's figures were satisfactory and it is regarded as particularly noteworthy that the company has now been able to show a further increase this year of no less than 117%. The greater part of this increase is due to the appreciation by agents in 40 countries of the opportunities open to the firm's type of equipment. In spite of such excellent results, the Directors feel that they have still virtually only touched the fringe of the demand in many promising overseas markets and in consequence are optimistic of being able to improve still further during the next 12 months on this rate of progress.

Copper Development Association

The Copper Development Association, one of the first among organisations for the effective distribution of information on technical advances for the benefit of industry, has just completed its 16th year of successful operation. At the annual meeting, held in London on November 9, it was reported that the Association's activities during the past 12 months constituted a record, particularly in the field of education, exhibitions and displays, and in the issue of technical publications. The Association maintains close liaison with the British Non-Ferrous Metals Research Association and kindred bodies in the U.K., Europe and the U.S.A. Mr. S. S. Taylor, C.M.G., D.S.O., Vice-Chairman of the Council of the Association, was elected Chairman to fill the vacancy caused by the resignation of the Hon. R. M. Preston, D.S.O., who had held this office since 1945.

An Ascot Display

Our photograph shows the instantaneous multipoint water heater on the balanced flue principle which is on display at the Building Exhibition stand of Ascot Gas Water Heaters, Ltd. A product of the Company's research laboratories, it is now being installed in two projects of



123 and 104 flats at Goldington Street, and Oakley Square in the Borough of St. Pancras. This built-in heater is still the subject of research work in the laboratories, but it is planned to commence deliveries in June of next year. A full description of the appliance was given in the *Journal* of March 23 this year (p. 659).

The Trade Statistics for September, 1949, issued by the Central Statistics Office in the Republic of Ireland, show imports of 19,966 tons of gas coal, valued at £89,639, as against 31,667 tons, valued at £140,674, in September, 1948. This brings the total of these imports for the first nine months of 1949 to 185,492 tons, valued at £835,590, compared with 224,395 tons, valued at £983,288, for the corresponding period of 1948.

Staff Problems

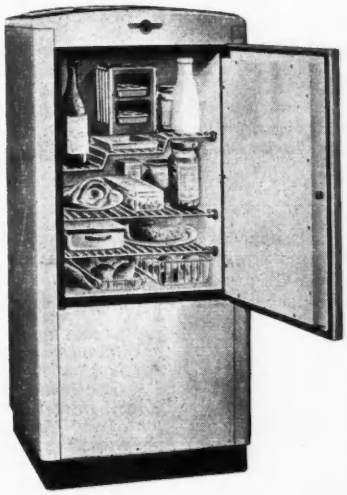
The Manchester Gas Branch of the National Association of Local Government Officers, which began its existence on vesting day and holds its first annual meeting on December 9, records in its *Bulletin* that the North Western Gas Board has applied with generosity of spirit a provincial council award on a number of grading appeals. Many inspectors who did not make appeals for various reasons have been included in the award. A number of appeals in the clerical and administrative grades also achieved a measure of success.

A network of Whitley Councils to deal with salary and service conditions is, says the *Bulletin*, still lacking and until it is constructed it is claimed that there is no adequate means of dealing with local problems. It is hoped that there shall be built a three tier structure with a National Joint Council at the top, area joint councils at area board level, and group, or district joint councils, at the bottom to deal with conditions at group or undertaking level. It is pointed out that the Whitley machinery for electricity staffs was ready on vesting day.

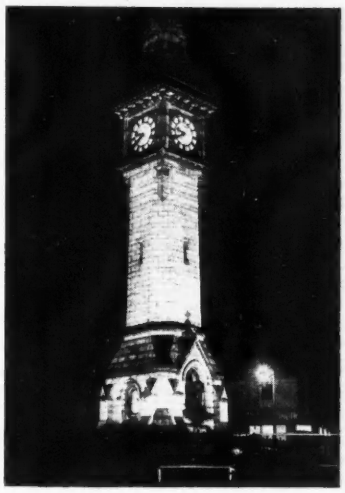
The employers have submitted proposals for a new salary scheme and sick pay provisions for clerical and A.P.T. staffs. These proposals are being considered by the staff side and it is hoped that at the consultative level they will be carefully examined. The Association has formed area consultative committees at area board level. Gas branches and groups of gas members in the North Western area are entitled to send representatives on a membership basis. One of the aims of the consultative committee is to co-ordinate the work of the branches in the area. The committee will also select the Nalgo representatives on the area joint council when it is formed. A national consultative committee will co-ordinate the work of the area consultative committees and from it will be selected Nalgo's representatives on the National Joint Council. The intention is to give gas members control over their own domestic affairs.

The gas industry has never been backward in ensuring that the younger generation is kept informed of the value of gas in the home and to the nation. To the list of visual aids and material available for school use, the Gas Council has now added two educational leaflets. 'The Treasure in Coal,' the last edition of which was published in 1943, has been revised and given a new and attractive cover with additional illustrations; the chart of products from carbonisation has been retained. Its companion booklet, 'The Story of Gas Making,' also revised, provides a brief outline of the carbonisation process. In addition, the Gas Council has also produced two short films, 'The Industrious Flame,' showing the use of gas in industry, and 'Uncle Explains,' on gas in the kitchen, together with a film strip on the U-tube pressure gauge. Of more direct interest to undertakings, the Gas Council can provide full details of a puppet show for use at exhibitions, in which Mr. Therm plays the 'lead'—a form of publicity which proved a great success at Maidstone's recent industrial exhibition.

THE 'POWER MASTER'



Our illustration shows the 'Power Master' (Le Bryan Group Products, Ltd., 372, High Road, Tottenham, N.17) (refrigerator (P.M.K. 350), a kerosene or gas operated absorption machine, now available. It is economical and its service can, of course, be enjoyed where no town gas supply may be available. It works with equal efficiency on bottled gas. The model illustrated has a capacity of 3½ cu.ft. with a shelf area of 5.5 sq.ft. and is fitted with two ice trays. It has been designed for tropical use and no English summer, however hot, should mar its performance. We are informed that servicing and maintenance arrangements are assured throughout the British Isles.



The clock tower in the main square at Tunstall, Stoke-on-Trent, was illuminated by the Stoke-on-Trent gas undertaking on the occasion of the recent visit to the Potteries of H.R.H. Princess Elizabeth. The picture—an excellent piece of photography as well as good example of gas illumination—was taken by Mr. E. J. D. Warrillow, A.R.P.S., F.R.S.A.

Company News

Meters, Ltd.

An interim ordinary dividend of 4%, less tax, for the half year ended September 30, has been declared.

South-Western Gas and Water Corporation

Following an announcement that a change of name was impending, the Corporation has now announced that it proposes to use the name of South Western Industrial and Water Corporation as being more in accord with its present activities.

Cannon Iron Foundries, Ltd.

Net profit for the year ended June 30 was £320,458, against £265,620 for the previous year. After providing £173,960 (£146,332) for taxation, and £100,000 (£64,886) for general reserve, payment of Preference dividends and an interim Ordinary dividend of 10%, making 15% (same), leaves a sum of £78,022 to be carried forward, compared with £59,024 for the previous year.

Calor Gas Holding Co., Ltd.

Net profit, after taxation, of the operating subsidiary for the year ended July 31 was £70,321, against £74,432 for the previous year. Of this sum, £27,358 relates to the period prior to the acquisition of shares by the Holding Company, leaving £42,963 available for distribution in respect of the seven-and-a-quarter months prior to July 31. Payment of a dividend of 18% for this period, equivalent to approximately 30% per annum, leaves £13,904 to be carried forward.

Whessoe, Ltd.

Whessoe, Ltd., are raising £300,000 by a rights issue of 200,000 Ordinary 5s. shares at 30s. a share to assist in meeting the cost of works reconstruction and to provide additional working capital. It is further proposed to double the increased Ordinary share capital to £500,000 by a bonus issue of a further 1 mill. Ordinary 5s. shares by capitalising the premium of 25s. a share on the issue of the 200,000 Ordinary shares. Treasury consent has been obtained. The directors point out that the doubling of the Ordinary capital will involve a corresponding reduction of dividend, which, on the basis of dividends paid in recent years, would in future be 20%.

Last Week's Output of deep-mined coal, 4,290,900 tons, was the highest of the year, exceeding by 29,900 tons the previous record established during the week ended November 5. The week's total output of 4,520,300 tons was 43,200 tons higher than that of the week before. Manpower both overall and at the face remained the same during the week ended November 12 as in the previous week. Gas available at gasworks totalled 11,368.9 mill. cu.ft. last week, against 11,134.9 mill. in the week before, and 1,056.9 mill. units of electricity were sent out for public supply, compared with 1,001 mill. over the same period.

GAS IN RURAL AREAS*

By C. E. GRIMWOOD,
Sudbury Undertaking, Eastern Gas Board

***EDITOR'S NOTE*:—Implementation of the Town and Country Planning Act of 1947, and possible future integration of gas undertakings under nationalisation, contends the author, should assist in bringing the advantages of a regular gas supply to farms, agricultural workers, and other dwellers in country districts.**

THIS is the second time that Sudbury has supplied a President for the Association, the last occasion being in 1895, when my grandfather, Charles William Grimwood, was elected as the sixth president. In considering subjects for inclusion in this address, I re-read the one which he delivered at the spring meeting after his election. I was impressed by the similarity of the problems confronting the gas engineer of his generation and those which are concerning some of us at the present time. Coal of poor quality and short in weight, a general insufficiency of plant to meet winter load conditions, and the price of gas oil were some of the matters commented upon. The preceding winter had been one of unusual severity, and a plea was made for the pooling of experiences, and their publication for future guidance. So far as I am aware, nothing of this kind was attempted until the Institution of Gas Engineers published the 'Scheme of precautions against frost on a gasworks' in 1942 as a result of experiences during the previous winter. A long and disastrous coal strike had recently ended in 1895, and there is the suggestion that 'every practical means should be tried before recourse is had to that most suicidal remedy—a strike.' Today the machinery exists for settling disputes in every industry, but there remains the problem of unofficial strikes which, although they deprecate them, the unions are unable to prevent.

This is the first presidential address to be delivered to the Association since the industry passed into national ownership on May 1 this year. Past presidents have frequently had something to say on the subjects of policy and administration, but these matters now become the functions of the area boards, assisted, as they no doubt will be, by the gas consultative councils. It is to be hoped, however, that discussions on these matters will continue to take place in this and similar associations, in whatever form they are eventually constituted and that the area boards may give consideration to the decisions reached. With his finger on the consumer's pulse, the gas engineer can claim to know his requirements at first hand, and suggest how best to supply them.

Vesting day passed with very little outward indication of the change in ownership. The long conjectured 'set-up' has at last been revealed, and says much for those whose duty it was to work out the details. The changes which have necessarily come about have, perhaps, been felt more in what were formerly the medium and smaller unattached companies than by the larger companies, those controlled by holding companies, and undertakings owned by local authorities. In these smaller independent companies it was quite usual to find a non-technical board relying to a great extent on the advice of their chief executive officer, and the successes which they enjoyed in the past are an indication of the wisdom and ability of those concerned.

Sudbury Gas Undertaking

Sudbury, like many other towns in East Anglia, is an ancient market town with an 'area of influence,' as defined by the latest planning surveys, extending to some six or seven miles radius. This area contains a number of large and small villages, depending on the town for most of the commercial and recreational requirements.

In January, 1836, the mayor presided over a meeting of burgesses, at which it was resolved that 'in the opinion of this meeting, it is expedient to form a company to light the town with gas.' The company was formed forthwith, with a capital of £5,000, and the building of the gasworks and laying out of the distribution system was entrusted to the brothers George and James Malam, who were responsible for the construction of other gasworks in the Eastern Counties, including Bury St. Edmunds, Newmarket, and Ely.

Mr. Grimwood commenced his training in the industry in 1920 under the late Mr. W. W. Townsend. He has served the Sudbury undertaking for 17 years, continuing as Engineer and Manager on the retirement last September of his father, Mr. C. G. Grimwood, who was Chairman and Managing Director of the Company. He thus maintains the long family record at Sudbury, which began in 1868 with the appointment of his grandfather.

The carbonising plant at Sudbury consisted of two settings of one and one setting of three oval cast-iron retorts 8 ft. long. The remainder of the plant comprised an air-cooled condenser, lime purifier, and meter. The counter-balanced holder in a brick and puddle tank, had a capacity of about 5,000 cu.ft., and from it the gas passed through a 'regulator' and to the town by means of a 4 in. main. A prospectus issued in the same year estimated that the gas sold annually would be 1¼ mill. cu.ft., and the coal required to make it would be 95 chaldrons.

The company appears to have carried on with varying fortunes for their first few years, but by 1845 the directors had decided to lease the undertaking to their works superintendent. Subsequent leases were granted to Roger Alexander Stark, of Woolwich, Thomas Hill Methven, of Bury St. Edmunds, Ebenezer Goddard, of Ipswich, and Charles William Grimwood, of Sudbury. On the expiration of the latter's lease in 1909, the directors resumed the management of the works after a period of 64 years. The demand for gas increased and more capital was needed to equip the works and district to meet this demand.

During the next few years, considerable extensions were carried out. The retort house was enlarged, and regenerator settings installed, larger dry-lute purifiers replaced the old wet-lute boxes, and a gasholder of 100,000 cu.ft. capacity was built.

The coming of an electricity supply to the town in the 1920's curiously enough added a stimulus to the sales of gas. Possibly this was due to the somewhat erratic nature of the supply, which was generated by means of a diesel engine salvaged from a German submarine of World War I. It became necessary to enlarge the retort house, and in 1929 to erect a holder of 200,000 cu.ft. capacity.

The influx of evacuees from danger areas in 1940 brought about another large increase in output, and after their return, at the cessation of hostilities, sales were maintained and have continued to increase. Sales in 1948 amounted to 102,600,000 cu.ft.

I would, at this point, like to pay a tribute to the former managing director, who was actively engaged in the under-

* Presidential Address to the Eastern Association of Gas Engineers and Managers, November 25, 1949.

taking for a period of over 60 years, and for the last 40 years as its chief executive officer. It was largely due to his untiring efforts and devotion that the company grew from small beginnings to the sound position which it occupied at the end of its history.

The present gas-making plant consists of four settings of eight horizontal stop-ended retorts, one setting of six retorts, and one setting of four retorts. In addition there is a carburetted water gas plant with a nominal capacity of 250,000 cu.ft. per day.

It is expected that work will commence early in the New Year on an installation of Woodall-Duckham continuous vertical retorts. This will consist of eight 53 in. major-axis retorts, with lambent heating of the latest design, waste-heat boiler, and all the usual ancillary machinery. The new house will have a nominal daily capacity of 690,000 cu.ft. of 500 B.Th.U. gas.

Gas Supply in Rural Areas

Several of the larger surrounding villages at one time possessed their own gas undertakings, but the difficulties encountered during and after the first world war caused some of them to close down. Many appeals were received for a piped supply from the Sudbury works, but the capital cost of connecting mains proved prohibitive. There is evidence that a demand for gas still exists in these places, even though most of them have been supplied with electricity for a number of years. Bottled gas is doing good service in country districts and, although it has some disadvantages, it is preferred to other fuels for cooking purposes by those who have been accustomed to gas or are anxious to abolish the drudgery of the old coal range. The Town and Country Planning Act of 1947 discourages isolated development, and envisages grouped rural communities. The result of this and possible future integration of gas undertakings should assist in bringing the advantages of a regular gas supply to some farms, agricultural workers, and other dwellers in country districts.

In 1927 arrangements were made to purchase the neighbouring undertaking of the Long Melford Gas and Coal Company, Ltd., whose mains extended to within about two miles of those from Sudbury. The works had originally been constructed to supply an agricultural engineer's foundry and workshops. Local demand had caused the owners to extend the mains beyond their own premises, and a company was formed which obtained an Order from the Board of Trade in 1887. Some difficulty arose over the purchase, as at that time Sudbury had no Order, and the Board of Trade would not consent to a non-statutory undertaking absorbing a statutory one. This was overcome by purchasing the shares of the Long Melford Company, and supplying them with gas in bulk. When in 1938 Sudbury obtained an Order the Melford company went into voluntary liquidation.

About 2½ miles of 7-in. low pressure main was laid to link the distribution systems at suitable points. Two small gasholders at Long Melford were retained. These act as balance holders, filling at off-peak periods, and feeding the surrounding district at times of maximum demand.

The privately owned gasworks in the village of Lavenham was acquired in 1937. These had been built in 1863 by Roger Alexander Stark during the time he held the lease at Sudbury. It was decided to lay 4½ miles of high pressure main, drawing from the Long Melford holders and connecting into the Lavenham system through a district governor The main-laying work was carried out by direct labour, using steel main with long sleeve joints made with lead wool. The pipes were oiled internally with boiled linseed oil This caused a somewhat unexpected result, as when gas was passed through it was completely 'stripped,' a condition which lasted with decreasing effect for more than three weeks until the oil was completely saturated. At Lavenham, again the two small existing gasholders were retained. Unfortunately the holders were situated at the end of the village, remote from the high pressure main, and it was not considered practical to extend this through the village immediately. In order to make the best possible use of the available storage, and to avoid the necessity of continually running the compressor at Long Melford, the pressure at the outlet of the district governor is set to overcome that thrown by the holders. During times of pumping the district is supplied direct from the governor, and surplus gas is stored in the holders, the gas passing into and out of the holders by one main. An automatic holder valve has recently been installed. This is of the diaphragm type, with pressure relay control, and is so arranged that when both holders are full the valve is closed. A fall of 3/10 in. pressure on the district operates the diaphragm and opens the valve. The closing of the holder valve causes a temporary increase of pressure in the district mains, which in turn closes the district governor. The effect of this is to increase the pressure in the high pressure main, which is normally 2 lb./sq. in. It is hoped to utilise this variation in pressure to stop and start the electric motor driving the compressor, so that eventually the system will become practically automatic in operation. A considerable increase in the gas consumption of both Long Melford and Lavenham resulted almost immediately after they were linked to Sudbury. This is attributed to the reduction which it was possible to make in the price of gas, to the assurance of a regular supply of even quality, and the ability of the larger undertaking to lay out more capital in the purchase of stoves and appliances for simple hire. A canvass was made, and the number of consumers soon increased, but I would like to suggest that too much reliance cannot be placed on the result of a canvass. The true East Anglian is a cautious individual and will not readily commit himself. He is, however, quite ready to adopt a new idea when it has been tried out by someone else, and found to be satisfactory.

Future of the Association

Following the resolution which was passed by the members at the spring meeting, negotiations have been proceeding with the Institution of Gas Engineers with a view to reconstituting this Association as a District Section of the Institution. It is possible, therefore, that I shall be the last to hold the office of President under our present constitution. It will not perhaps be inappropriate to say a word or two about the history of the Association. It was formed as the Eastern Counties Gas Engineers and Managers Association in 1888 after a preliminary meeting held at Peterborough, at which 24 engineers and managers gave their assent. W. Barret, of Grantham, was elected the first president, and H. Wimhurst, of Sleaford, the first Secretary and Treasurer. Fifty-seven presidents have occupied the chair representing most of the undertakings in Eastern England, and there have been nine honorary secretaries and treasurers. The Association has provided a number of presidents for the Institution of Gas Engineers.

In 1906 it was decided to form two commercial sections. These were known originally as the Eastern Section and the Western Section, the areas being later changed, for the convenience of members, to the Northern and Eastern Sections. In the days before controls limited their scope, very much useful work was accomplished by these sections in regulating the prices of residuals. Members derived considerable mutual benefit from the discussions which took place at the regular bi-monthly meetings.

A list of 97 names is appended to a statement of accounts published in 1908, but no distinction is made between members and associates. During the presidency of Mr. J. Hunter Rioch in 1945 new rules were adopted to bring them more into line with present-day requirements, and the name was changed to the Eastern Association of Gas Engineers and Managers. At the end of 1948 the Association comprised four honorary members, 122 members, and 33 associates. It is true to say that it fulfils the objects for which it was formed, and as a rose by another name we hope it will continue to promote the fellowship of its members and encourage the advancement of the gas industry.

TREATMENT OF EFFLUENT LIQUORS FROM GASWORKS*

By JAMES J. PRIESTLEY, M.Sc., M.Inst.Gas E., A.M.I.Chem.E.,
W. C. Holmes & Co., Ltd.

The growth of the effluent problem over the past 25 years is discussed together with reasons for that growth. The influence on the economics of disposal made by recent legislation regarding the discharge of effluents into sewers and rivers by an expanding industry is described. Reasons for the objectional nature of effluents are recapitulated and the formation and properties of individual constituents are reviewed in detail. The limitations of the oxygen absorption (O/A) value of liquors and constituents as a criterion of 'strength' are given. The various methods which may be used for reducing the production, improvement after production and finally complete disposal are described. Then follows an account of modern plants under construction—namely, dephenolation plants using butyl acetate for the solvent extraction of phenols and the Tingley scheme for the complete disposal of effluents with the production of saleable commodities. Some new laboratory work is described and the suggestion made that mutual advantage would result from closer co-operation at national level of authorities concerned with the production and disposal of effluents.

THE disposal of gasworks effluents is becoming a subject of increasing importance. The problem is not the same for all undertakings, a factor which brings complications when the subject is reviewed as a whole. Some undertakings claim to be able to dispose of their effluent into the sewers without any trouble, while others are faced either with disposal into the sewers at a prohibitive cost or alternatively disposing completely of the effluent at the gasworks. Most, of course, are placed between these extremes, but in the main the problem tends to become more rather than less acute. The main reasons for this present state of affairs are (1) the Public Health (Drainage of Trade Premises) Act of 1937, (2) the Rivers Board Act of 1948, and (3) the changes and increase in gas production.

These three points concern the period 1937 to the present day, but it is well to consider the growth and recognition of the problem before 1937. The aqueous effluents from a gasworks include water used for coke quenching, gasholder overflow water, water used on condensers of various sorts, and ammonia liquor. The last named is the most important, the others being relatively innocuous, and is the one with which we are concerned.

Growth of the Problem

Up to about 1923, ammonia liquor was regarded as a valuable by-product, being the source of ammonia for ammonia sulphate. With the advent of synthetic ammonia the price of sulphate became so low that the manufacture of the salt on gasworks became uneconomic (7). Most of the smaller plants were shut down and liquor discharged direct into sewers or rivers, until eventually this became common practice, either by agreements with the sewage or river authorities, or, in some cases, without. As we shall see the discharge of raw liquor, as contrasted with still effluents, increased the pollution effect considerably.

The problem was recognised when in 1926 the Liquor Effluents and Ammonia Committee of the Institution of Gas Engineers began its considerable research work, which is still proceeding.

Coming now to 1937, the Public Health (Drainage of Trade Premises) Act revolutionised the whole position. This Act requires the sewage authorities to accept and treat trade effluents, and to make the alterations and additions to their works necessary for such treatment. It is important to note that all existing agreements between gas and sewage authorities were accepted and confirmed. Hence conditions in 1937 became datum conditions for every gasworks. For example, if a works had an agreement for the discharge of 10,000 gal. per day of effluent having an O/A of 1,200 at 6d. per 1,000 gal., it could go on doing so under the new Act. If, now, the volume of liquor were increased by 1,000 gal. per day, the treatment of this extra volume had to be covered by an entirely new agreement.

Since 1937, gas production has increased from 342,000 mill. cu.ft. to 418,000 mill. cu.ft. in 1946, an increase on 1937 figures of over 22%. An increase in gas production is always accompanied by a corresponding increase in the amount of liquor produced, and this extra liquor must be the subject of new agreements. Local authorities in England and Wales have powers to formulate the conditions upon which such effluents will be accepted and to make charges for acceptance. In the absence of any prior agreement no payment is required if the volume and strength of the liquor discharged in relation to that *lawfully* discharged during the year ended March 3, 1937, have not materially increased (2). It follows that as the size of an undertaking grows, the volume of effluent will increase, and the cost of disposing of this extra effluent at usually a higher cost must be faced by that undertaking. There is no uniformity in the method of charging for effluent disposal. This is due to (a) inadequate information on the effect of different constituents of liquor or sewage purification, (b) various standards of purity required of sewage effluents, and (c) the differing attitudes of local authorities towards the question of payment (2).

Since it is usual in practice for the liquor volume and 'strength' to be considered together, any unavoidable increase in volume must be offset by a reduction in 'strength' if extra charges are to be avoided. This may be done by the removal of some of the liquor constituents which contribute to the 'strength,' *i.e.*, liquor of effluent treatment at the gasworks.

The Rivers Board Act of 1948 unifies the control of the rivers and improves the administration of the Rivers Pollution Prevention Act of 1876 and the Salmon and Fresh Water Fisheries Act of 1923, regarding the admission of effluents. Previously over 1,600 authorities in England and Wales had powers of one kind or another to deal with rivers. This led to a complete lack of uniformity in the discharge of effluents into them. The discharge of effluents into a river is far more serious and harmful than discharge into a sewage system, and the best permanent improvement in the state of a river may be made by diverting such effluents into the sewers rather than into the river direct (22). It is beyond a doubt that under the new Rivers Boards' administration, a stronger line will be taken regarding effluent discharge, and lest it is thought that gasworks effluent discharge is of little consequence, the observers who compiled the booklets on 'Pollution' for the British Field Sports Society tell a different tale (23). One example will suffice.

'The stream is practically all effluent from the various gasworks serving X, which appears to be emptied entirely untreated into the brook. The pollution is from phenols and tar acids. Although it has been covered where it passes through X, its presence can be detected in the nearby streets

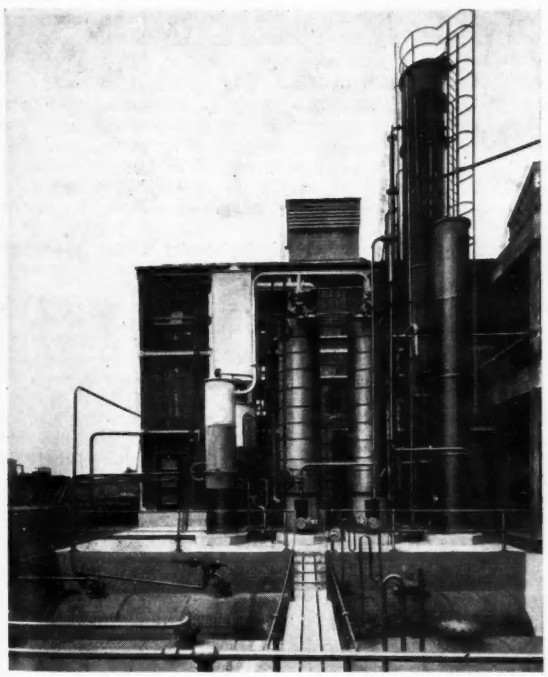
*Paper to the Scottish Junior Gas Association, (Western District), November 18, 1949.

where the smell of tar pervades the air. The stream itself is a deep red brown colour, warm steam comes up from the surface and at close quarters smells like a tar spraying machine.' The observer goes on to say that this stream joins a river and as a result of gasworks pollution all animal and vegetable life is extinct for six miles downstream, but there is no real recovery for a further nine miles.

Polluting Effects of Liquor Discharge

It might be of use to enquire at this stage into the precise reasons why ammoniacal and effluent liquors are considered objectionable. First, most of the dissolved constituents of these liquors have the property of absorbing oxygen from solution. Secondly, most of the constituents have a direct toxic effect. These considerations are of importance whether the liquors are discharged into rivers and estuaries or into sewers.

Considering the river discharge first, absorption of oxygen by constituents of the liquor quickly deprives the water of the dissolved oxygen upon which fish have to depend. In addition, the water usually loses its power of self purification and becomes foul and objectionable. Secondly, most of the constituents are directly poisonous to fish life. A detailed study of the combined effects of oxygen deficiency and toxicity are given by Southgate (3) (Chap. 3). Lest we should get the impression that the preservation of fish life merely means protecting the rights of sporting anglers, Southgate cites the

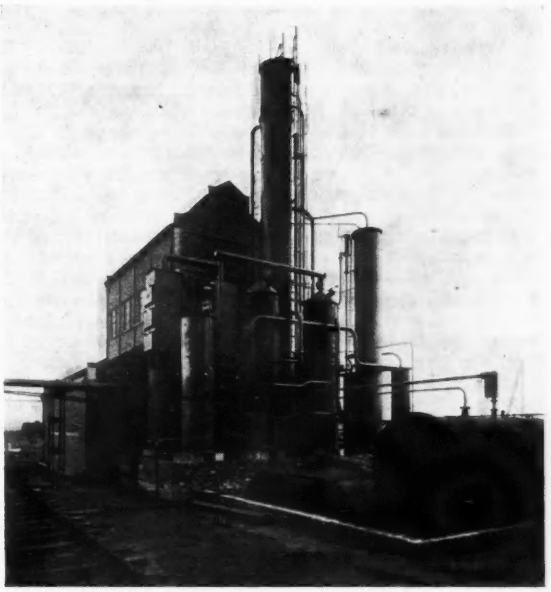


Dephenolation plant at Partington works, Manchester

considerable economic importance of inshore fisheries and moreover states that rivers which will not support fish life are usually unsuitable for domestic or high quality industrial purposes. Effluents sometimes give rise to colour, taste, and odour in water, even when they are present in very small concentrations.

The function of sewage works is to oxidise those materials which require oxidation prior to discharge into a river. It is an intermediate stage where oxidation which would normally take place in the river is carried out much more rapidly and thoroughly. However, as oxidation at such a works is carried out by bacterial action, great care must be taken, when discharging oxidisable material to it, that it is not wholly toxic to the bacteria, otherwise the operation is completely upset. Key ((4) p. 33) lays down minimum conditions which should be observed if liquors are to be successfully treated at sewage works :—

(1) Liquors must be free from tar.
(2) The temperature should not exceed 110° F.
(3) The ratio of liquor to the dry weather sewage flow should remain constant.
(4) Liquor flow should be under strict control.



Dephenolation plant at Provan works, Glasgow

Finally, the most important factor is the relative quantity of liquor to domestic sewage. Generally speaking, no serious difficulties arise if the ammonia liquor does not exceed 0.3% of the amount of sewage. This percentage may be increased to 0.4% if the liquor is stripped of ammonia.

Assessment of Liquors

The ultimate destination of all waste liquors is the sea, by way of the rivers and estuaries. It is important that waste liquors should not be discharged direct into those rivers, but rather by way of the sewage works. Key emphasises this point ((4) p. 57) even when sewage is discharged without previous biological treatment, because thorough mixing and the avoidance of pockets of waste liquor in the river are vital to fish and other forms of life.

It is therefore almost axiomatic that sooner or later waste liquors will be treated at sewage works. It is important, therefore, to consider in some detail the effect of liquors on the operation of sewage disposal plants. It is important because, whatever pretreatment, if any, is carried out at gasworks, the sewage works has to finish off the disposal process by bacterial oxidation. The more pretreatment is done at the gasworks, the less remains to be done at the sewage works.

The economic aspect of the acceptance of waste liquors by sewage authorities has already been discussed. It is proposed now to review, first, methods of assessment of liquors, and secondly the various compounds, organic and inorganic, which are in solution, because the full understanding of effluent treatment problem involves a knowledge of their formation, occurrence, and properties, why some are more objectionable than others, and how they may be treated.

(1) Oxygen Absorption (O/A) and Biochemical Oxygen Demand

It is impossible to assess by analysis alone the effect of adding waste liquors to sewage, analysis being useful only

when it can be related to practical trials. Two standardised tests are in general use for the determination of the 'strength' of sewage and liquors. The analytical results obtained from them may be quite different. This is not because of inaccuracy, but because they measure different quantities, even though both are designed to show how much oxygen a given sample will require to oxidise it. Moreover, a considerable amount of confusion of thought has arisen because a clear understanding of the meaning and limitations of the results obtained has been lacking.

The two tests are described in detail elsewhere ((4) p. 138), but may be summarised as follows. In the oxygen absorption test (O/A) the sample is oxidised for four hours at 26.7° C. by N/80 acid potassium permanganate solution. In the biochemical oxygen demand test (B.O.D.) the sample is diluted with water containing oxygen in solution, the mixture being placed in bottles which are completely filled and tightly stoppered, and maintained at 18.3° C. for five days. The oxygen content of the mixture before and after the test period (or 'period of incubation' as it is called) is determined and the amount used is calculated.

The O/A test is rapid and easy to carry out, the B.O.D. test lengthy and requiring experience and skill. However, the B.O.D. test was considered by the Royal Commission on Sewage disposal to be the one giving the best criterion of the polluting character of a sewage or effluent (5). Oxidation at a sewage works is not purely chemical, but biochemical; therefore, an oxidation test which is fundamentally biochemical, as is the B.O.D. test, is likely to give more accurate information about the amount and rate of oxygen required than, say, the O/A test, which is purely chemical.

With ordinary domestic sewage the two tests give results which are in a fairly constant ratio. In fact, the O/A value and B.O.D. value of a well purified effluent from normal domestic sewage are almost identical. The O/A test, being quick and easy to carry out, is widely used for routine testing, so much so that there has been a greater tendency, particularly on small sewage works, to give to the O/A value the significance which really belongs to the B.O.D. value, and to use it as the sole criterion of the quality of an effluent. Key pointed out ((4) p. 31) *this assumption cannot be justified when the sewage contains trade wastes of a composition entirely different from the sewage itself.*

It is considered that the failure to realise this simple fact is the cause of considerable misunderstanding. The O/A value of a liquor cannot be taken as the sole criterion of the 'strength' of the liquor, which in other words means a measure of the amount of extra work which would have to be done at the sewage works to oxidise it. For instance, higher tar acids have a high O/A value but, being virtually unoxidisable by biochemical means, throw no extra load on the sewage works. Ammonia, on the other hand, has no O/A value but involves a considerable amount of biochemical oxidation. The Institute of Sewage Purification (2) points out that although the O/A test would seem to show that ammonia liquor was 100 times as 'strong' as domestic sewage, the B.O.D. test shows it to be only 10 or 20 times as strong. In conclusion, it should be stressed that the figure of 2.0 parts per 100,000 recommended as a standard by the Royal Commission for treated sewage discharged into rivers is not an O/A but a B.O.D. value.

(2) Individual Constituents of Liquors

Most of our detailed knowledge of the behaviour of liquor treatment with sewage was obtained from the researches of the Liquor Effluents and Ammonia Committee of the Institution of Gas Engineers (6) and summarised by Key ((4) Chap. VI).

(i) *Ammonia,* the largest constituent of ammoniacal liquors, is formed during carbonisation. It is removed from the gas by condensation and water washing and may form free and fixed salts. Free ammonia has no O/A or B.O.D. value, but is a very undesirable constituent for sewage treatment. High concentrations are toxic to the bacteria and oxidation takes place very slowly. Ammonia as ammonium carbonate remains unchanged for nine days after which it is converted to nitrite and nitrate. Until oxidation is complete, it will cause an increase in the B.O.D. value of the treated sewage. Fixed ammonia is usually smaller in quantity and is not toxic. It is oxidised in a similar manner to free ammonia.

(ii) *Sulphide.*—Formed during carbonisation and absorbed by aqueous condensates and wash water. O/A value is 1,345 p.p. 100,000 per gm. H_2S per 100 cc. Sulphide is easily oxidised in bacterial beds, but the maximum concentration tolerated is smaller than for phenol and thiocyanate.

(iii) *Thiocyanate.*—This is formed subsequent to carbonisation by the interaction of sulphide and hydrocyanic acid with oxygen. O/A value is 827 p.p. 100,000 per gm. CNS per 100 cc. Thiocyanate resists oxidation until sufficient special bacteria, which are capable of oxidising it, are produced. Unless the total amount of thiocyanate is kept reasonably constant, oxidation ceases. Ammonia is a primary product of its oxidation which in turn has to be oxidised ((4) p 56).

(iv) *Thiosulphate.* as with thiocyanate, is formed subsequent to carbonisation by the oxidation of sulphide. O/A value is 856 p.p. 100,000 gm. per 100 cc. Oxidised at about the same speed as sulphide. With both thiocyanate and thiosulphate the fixed ammonia associated with them must subsequently be oxidised.

(v) *Phenol.*—Phenol and cresols are formed during carbonisation by the high temperature degradation of more complex hydroxyl compounds. O/A value is 1,780 p.p. 100,000 gm. phenol (C_6H_5OH) per 100 cc. Monohydric phenols are fairly easily oxidised, being grouped with sulphide and thiosulphate in this respect.

(vi) *Higher Tar Acids.*—Little is known of this very important group. They are extremely difficult to oxidise by biochemical means and are responsible for the production of highly coloured effluents.

Their O/A value is high and usually appears as a difference figure between the determined O/A value of the liquor and the sum total of the calculated values of the other constituents. The difference figure is usually several times greater than the direct determination of oxygen absorption by shaking up a sample of liquor with gaseous oxygen in a Bunte burette ((4) p. 134).

Since this difference figure is higher for vertical retort and low temperature carbonisation liquors than horizontal retort liquor, it is considered that the higher tar acids (H.T.A.) are primary products of carbonisation. Phenol itself is a high temperature product, formed by the thermal decomposition of more complex hydroxyl compounds released during the primary decomposition of the coal substance. In fact, the absence of phenol itself has been usually employed as a test for a true primary tar (21), although such tars may contain up to 50% of phenolic bodies. It is doubtful what the term 'higher' really means when applied to tar acids. Usually the terms 'higher tar acids' and 'polyhydric phenols' are regarded as interchangeable, but this may not be justifiable. If 'higher' refers to boiling point, it may be pointed out that xylenols, usually classed by the tar distiller as 'high boiling tar acids,' are monohydric phenols.

Monohydric phenols other than phenol itself which may be present are the cresols, xylenols, and more rarely methylated phenol homologues, which contain a single benzene ring. Besides these there may be naphthol derivatives containing two six-membered rings (21).

Dihydric phenols known to be present are ortho and meta dihydroxy benzene—*i.e.*, catechol and resorcinol. Catechol oxidises and turns brown on exposure to air, but resorcinol does not absorb atmospheric oxygen, results which we have confirmed experimentally.

Beyond this nothing is known with precision, but there are certainly groups of phenolic bodies which have been separated from low temperature tars, by treatment with petroleum ether, in which they are insoluble. Edwards (21) reports the separation of a solid resinous mass, which set to a brittle solid. This material, which he termed 'rhetinols' was soluble in ether and alkalis, and was in that portion of the phenols boiling over 260°C. Brittain, Rowe, and Sinnatt observed a similar phenomenon, their phenols increasing in viscosity on keeping when exposed to air and light (21).

Having now stated the aspects of the effluent problem, both financial and technical, methods of solution of the problem

may now be considered. None of these is a complete solution, and many are complementary to each other. The first group of methods consists of precautionary measures to reduce the volume and improve the composition of the liquor during production. The second group includes methods of treatment at gasworks prior to discharge to sewage works, and finally methods of reasonably complete disposal, without the assistance of a sewage works.

(1) Reduction in Volume and Improvement of Composition

(i) Reduction of volume by eliminating all unnecessary additions of water to the gasmaking and purifying system reduces the amount of liquor subsequently to be handled. The size of any treatment plant and the amount of heat and power for pumping are correspondingly reduced. Apart from a careful check on undecomposed steam from vertical retort steaming, the largest economy may be made by substituting stripped liquor (*i.e.*, liquor containing no free ammonia) for water in the final ammonia washers. Henshaw & Cooper (7) reported that an enrichment of some 20% in the weak liquor is to be expected when the hot condensate from the condensers is used in the final ammonia washers. An additional advantage is the freedom from scale-forming compounds in these liquors.

A method practised on a large scale at Partington by Holton (8) not only effected a volume reduction but also an improvement in composition. Volume reduction in this case was by partial evaporation. This process removed the relatively non-volatile ammonium chloride which has a maximum concentration in the retort house liquor, which was recycled without cooling until the ammonium chloride concentration reached 14-18%. This was periodically withdrawn and evaporated in a plant designed for that purpose and the crude ammonium chloride subsequently purified.

A further effect, noted by Key and Cobb (9), was that the increase in concentration of ammonium chloride diminished the proportion of higher tar acids in the solution since they were 'salted out' by the chloride.

(ii) Improvement of composition alone may be made in respect of higher tar acids on the one hand and the thiocyanate thiosulphate concentration on the other. These may be effected by changes in gasworks technique, and have been described in detail ((4) p. 70). Briefly, the amount of higher tar acids present in liquor is reduced by permitting only the minimum contact to take place between the tar and the liquor. Higher tar acids, being non-volatile in steam, condense with the tar, but dissolve in retort house liquor in contact with tar.

(*To be continued*)

BIRMINGHAM'S EFFLUENT PROBLEM

AT a meeting of the Midland Branch of the Institute of Sewage Purification in Birmingham on November 23 Mr. **A. J. Clifford** gave a paper in which he described recent experimental work on the treatment of gas liquor at West Bromwich sewage works. In the course of his paper Mr. Clifford said :—

During the consideration of the type of treatment plant necessary to bring the West Bromwich sewage purification works to a state of proper efficiency, an important factor arose —namely, the application of the then Birmingham Gas Department for the treatment of gas liquor from their Swan Village gasworks which is situated within the County Borough of West Bromwich. Two years ago, a preliminary approach was made by the Birmingham gas undertaking on these lines and this was followed by a formal application in June of last year. At that time, the gas liquor from the Swan Village gasworks was taken to Messrs. Chance and Hunt for treatment. The Birmingham gas undertaking received intimation from Messrs. Chance and Hunt that they would not be in a position to accept gas liquor as from March 31, 1949, and as a consequence, representatives of the undertaking had consultations with the Borough Surveyor and myself on the question of treatment of liquor from their works. They were informed that the West Bromwich sewage works were already working up to capacity, but that there was a possibility that added capacity could be obtained on the filtration plant by means of recirculation. It was, however, stated that the efficiency of such a method with heavy gas liquor loading could not be determined without large scale experiments. The representatives of the Birmingham undertaking expressed their willingness to co-operate and to provide the necessary pumps and equipment to carry out such experiments in order to ascertain the West Bromwich ability to take and treat liquor from their Swan Village gasworks. The quantity given as their flow was 12,000 gal. of crude gas liquor per day.

The gas liquor discharged to the sewers from the West Bromwich gasworks at the present time amounts to 4,000 gal. per day of 8 oz. liquor or 0.11% of the present dry weather flow.

The immediate application by the Birmingham undertaking is for the treatment of 12,000 gal. per day of crude liquor. The total loading on the sewage treatment plant in the near future will therefore be:—

	Gal. per day	*lb. O/A Loading*
Sewage D.W.F.	3,500,000	
Gas liquor		
(West Bromwich)	4,000	800
(Birmingham)	12,000	2,400
	3,516,000	3,200

The quantity of gas liquor approximates to 3,200 lb. of oxygen absorption loading on the sewage plant per day and does not take into account any increase of liquor from the new Swan Village gasworks.

The treatment of gas liquor would absorb much of the benefits of recirculation. Therefore, in assessing the percentage of loan charges to be borne by the Birmingham undertaking, consideration must be given to the percentage loading on the plant from the gas liquor and from the sewage respectively.

Experimental Plant Results

Experimental plant results reveal that they can be assessed as follows:—

Gas liquor	60%
Sewage	40%
	100%

On this basis, the Birmingham gas undertaking should be responsible for 60% of the loan charges on the provision of additional plant and works, amounting to £840 per annum.

It is estimated that it will be necessary to purchase power equivalent to £1,200 per annum. Again, working on the basis of 60% attributable to Birmingham, this is equivalent to a charge of £720 per annum.

It is not anticipated that any extra labour will be involved but considerable technical skill in control of plant will be needed and it is suggested that a further £100 per annum is a fair estimate.

ESTIMATED EXPENDITURE ON TREATMENT OF GAS LIQUOR TO BE CHARGED TO THE BIRMINGHAM UNDERTAKING

Loan charges	£841
Power	720
Administration	100
	£1,661 per annum

The Birmingham gas undertaking has requested that charges made shall be based on lb. loadage of oxygen absorption—that is, on strength plus volume of liquor.

In order to cover the above estimate, the charge would be 0.45d. per 1 lb. oxygen absorption loading or 7s. 5d. per 1,000 gal. of gas liquor having an oxygen absorption of 2,000 parts per 100,000.

In the case of West Bromwich, at the present time the bulk of gas liquor does not enter the sewers, but is delivered by canal, so that its influence is not felt on storm water. It is, however, suggested that very careful thought should be given to the possible effect a heavy gas liquor dose, such as 0.5%, can have on storm water.

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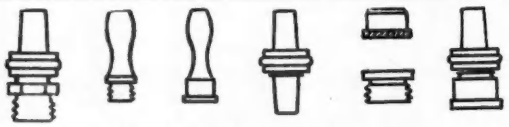

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